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THE
PRINCIPLES AND PRACTICE
OF
MIDWIFERY
WITH SOME OF THE
DISEASES OF WOMEN

BY
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PREFACE.

THERE are not wanting many admirable works on the principles and practice of Obstetrics; but there are various principles and rules which the Author has found of inestimable service in his own practice, which are either not mentioned in these, or are referred to only in terms of disapprobation. These principles and rules have reference, more particularly, to the management of the second and third stages of labor. There is assuredly a wide and growing belief, not only among the younger practitioners, but also among not a few veteran brethren who have been able to emancipate themselves from the shackles of doubtful, if not injurious, traditions, that too great delay in the second stage of labor especially has hitherto been inculcated in the text-books, and that, had earlier interference been more widely taught and practiced, maternal and fœtal mortality would have been greatly diminished. Recent investigations strengthen this view, bringing out, as they do very strikingly, the fact that delay has proved much more injurious than interference, and, moreover, has given a false complexion to operative procedure not necessarily attended with danger. These views, therefore, the Author has endeavored to give expression to, in the hope that good may gradually accrue. The seed he believes to be good, and he trusts that it may fructify in the course of time, and yield the welcome blossom of maternal safety. That is the harvest all obstetricians are earnestly striving after.

Prominent notice has been taken of the operations of cephalotripsy and spondylotomy—operations which the Author believes are destined to limit considerably the difficulties and maternal dangers of craniotomy; and reference has been made, though briefly, to the influence of zymotic disease on gestation and the puerperal state. Had space permitted, he should have liked exceedingly to have entered more fully into these important topics.

As regards the subject of Diseases of Women, he has to remark that, while an account of the great mass of these would have been quite foreign to the purpose of the work, he has yet introduced more of them than is usual in such manuals. He has, however, only touched on those closely connected with pregnancy and the puerperal state.

He has not inserted many cases in illustration of principles and practice, but the reason is the want of space, and not the want of such cases. He has numerous notes; and he writes within gunshot of many brethren who have seen him operating in the more difficult cases of labor. These examples, if opportunity offers, he may yet bring together, either as a supplementary or separate work.

As the book has been entirely written during the past winter, the Author has been enabled to incorporate with it the more recent obstetric news and questions of importance and interest.

The Author has been profoundly conscious alike of the great responsibility of his undertaking, and of his shortcomings in relation to the work; but he has attempted the task with the best of motives, the purest of aims, and with an earnest desire to be useful: he might add, also, with far from sanguine hopes. Moreover, he has not entered on the labor without having been much engaged in practical midwifery for upwards of a decade, during part of which period he has had the honor of being consulted by numerous brethren in the more critical cases of operative midwifery. On many such occasions, he is happy to say, he has experienced the value of various rules and lines of practice, which he has endeavored, it may be imperfectly, to state in the following pages. As regards his gynæcological experience, that has not been inconsiderable. In addition to attendance in the late Sir James Simpson's ward from season to season, he has enjoyed many opportunities in private practice; and he has always found that cases flow readily into the hands of those who are not indifferent to them, or, rather, who bestow marked and special attention upon them.

He is quite conscious that many blemishes attach to the book; but he trusts that these will be in part excused by the laboriousness of practical obstetric work. An imperfect sentence, a dull paragraph, or even a tedious chapter, may be often credited to a tedious labor invading the period when the *cerebrum* should have indispensable repose. He puts forward this plea on behalf others as well as himself; for he feels assured that his professional brethren would often write better had they more unbroken time. To them, unfortunately, as a rule, belongs not the leisure to indulge in erasures, like Rochefoucault and Rousseau, Petrarch and Pope; or in elisions, like Molière and Milton, Shakespeare and Shelley, Virgil and Byron; to write and re-write, like Cowper; to groan over reluctant sentences, like Gibbon; and sweat for more than a year over a story, as did that old Edinburgh medical student, Goldsmith, in the case of the "Deserted Village." A busy physician of this city, not long ago, produced a highly creditable translation of the "Satires of Horace;" it was, on the whole, well received; but had the author been, say, a bishop, with abundance of unbroken time at command, any little adverse criticism which it may have provoked would, mayhap, have had less of justification or excuse. Writing, as this professional brother did often, like Erasmus, in a post-chaise—nay, with perhaps the sufferings of the diseased, or even the groans of the dying, burdening his spirit and haunting his mind, it was wonderful that he did so well. If critics do not heed such considerations, so much the worse for their criticism. Professional (medical) reviewers, at least, ought to be able to rise to the moderate height of this piece of justice; for they know well the whirl and distraction of the common calling, and how inimical it is to sustained meditation and reflection, not to say faultless composition. The "last and greatest art" in writing, the "art to blot," is doubtless of vast importance; but then it demands time, and that is not always given to the medical man, more particularly the busy obstetrician. But enough on this matter.

The Author cannot close these preliminary remarks without acknowledging his deep indebtedness to the better-known obstetric works, or, more correctly, to the distinguished authors of these works. He owes much, indeed, to them; but, at the same time, he can say with Baudelocque, that he has learned not less from closely observing Nature. She is the great Preceptress; and if we approach her in a docile spirit, with an anxious desire for truth and profit, without bias, and free from the trammels of absurd traditions and rotten codes, sound and invaluable instruction is sure to be obtained.

In conclusion, the Author hopes that if his book should fall into the hands of former pupils, whom he had the pleasure of assisting in obstetric difficulties, it will recall agreeable intercourse, and perhaps also revive useful hints and views of practical importance and interest. If this should be the case, and especially if they should find obstetric practice go more smoothly with them, and maternal and fœtal mortality diminish by an adoption of the rules and practices inculcated in the work, then will he be well repaid for any little trouble he may have incurred.

EDINBURGH, May, 1871.

PREFACE TO THE SECOND EDITION.

THE first edition of my work on Obstetrics, etc.—a very large one—having been exhausted, I have now, at my Publishers' request, prepared a second. The duty has been one alike of difficulty and of love: of difficulty, because my time for literary work is now sadly limited; of love, because my earlier leaning towards Midwifery has not abated with the lapse of years. But while saying that the task of revision has been somewhat operose, I must add that it has been my anxious endeavor to note and record the chief advances made in the department since the appearance of the first edition. These of a substantial character have not been very numerous; but we all know that lasting discoveries are of tardy growth. It is with much pleasure and pride that I look back to the kindly reception which was accorded to the previous edition, not only by the leading professional journals, but by obstetricians of the highest distinction, at home and abroad. It is also consistent with my knowledge that the book was appreciated by medical students in the different universities and schools. This general approbation has been, as said, highly gratifying to me. I may add that, while introducing new matter, I have not failed to eliminate certain redundancies which were kindly pointed out by competent critics when the book first appeared. In conclusion, I have to thank those eminent teachers of the science and art who were good enough to recommend it to their various classes; and I trust that the same warm approval will be bestowed on this new edition.

A. M.

EDINBURGH, October, 1878.

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PRINCIPLES AND PRACTICE OF MIDWIFERY.

CHAPTER I.

THE PELVIS.

In order to understand aright the mechanism of parturition, a knowledge of the organs and parts concerned in it is indispensable. We begin with the pelvis first, and shall treat chiefly of those points which are of paramount obstetric interest and importance.

1. **Position of Pelvis in the Skeleton.**—The pelvis is placed at the inferior extremity of the vertebral column, with which it articulates at its posterior and upper surface, forming there a striking projection or promontory, termed the sacro-vertebral. This is a part of deep obstetrical importance. Below, the pelvis is supported by the two femoral bones, the acetabula receiving the heads of these bones. The pelvis thus forms the lower boundary of the abdominal cavity, affording also room for the bladder and rectum, as well as the uterus. This position, as has been often pointed out, is most admirably adapted and designed, for Nature is enabled to aid the uterine force of parturition with those other muscular powers which she employs in the expulsion of the contents of the rectum, etc.

2. **Inclination of the Pelvis.**—The pelvis in the upright position is oblique to the horizon, and not vertical. A perpendicular line marking the axis of the trunk does not pass through the centre of the upper strait or brim, but impinges on the symphysis pubis. (See fig. 1.) The line, again, that marks the centre of this strait, intersects the perpendicular one at an acute angle. This obliquity is an extremely wise arrangement, for did it not exist—were the axis of the trunk and that of the brim to correspond, evil consequences would result to the pregnant female. The gravid uterus would gravitate down into the pelvic cavity, and press injuriously on the contiguous viscera. Various pathological changes might be entailed, interfering alike with the process of normal pregnancy and that of parturition. This obliquity, then, opposes the injurious gravitation of the pregnant womb, by enabling it to find a solid support on the anterior pelvic bones.

3. **Bones of the Pelvis.**—The adult pelvis consists of four bones—

viz., the two *ossa* innominata, the sacrum, and the coccyx. During early life, when ossification is incomplete, 14 bones may be counted, the sacrum being composed of 5, the coccyx of 3, and each innominate bone also of 3 pieces. As years advance, consolidation takes place, and by the period of puberty they are generally blended into one. We shall touch briefly on these bones separately, before considering them as a whole, and as making up the pelvis.

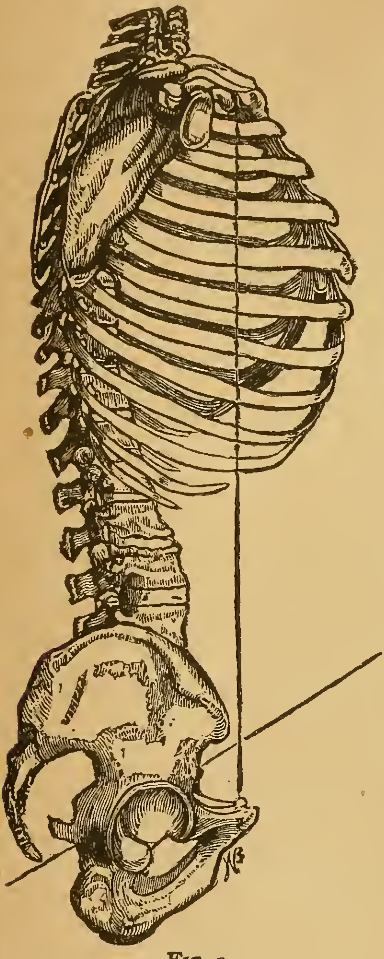

Fig. 1.

4. **Os Sacrum, or Os Basilare.**—This is placed at the lower part of the vertebral column, of which it may be said to form a part. It is of a triangular shape, and is wedged in between the innominate bones. Its apex is placed downward and backward, while the base looks upward and forward. It is of very spongy texture, and this with its numerous foramina, makes it the lightest bone in the body. It has four surfaces, an external and internal, and two lateral. The anterior or internal surface is the one that peculiarly concerns the obstetrician. This surface is smooth and concave, and constitutes the back wall of the pelvic cavity. This hollow or concavity is deeper in the female than the male, and wisely so, as we shall see. For example, it varies in reference to the segment of a circle, which it forms in different people. If it be too straight, it may retard labor by hindering the descent of the head; and, on the other hand, if too much curved, it may also impede, both toward the brim and outlet. The upper part of the sacrum, where it joins, through the medium of cartilage, the last lumbar vertebra, is also a part of much interest and importance. This part, sacral promontory, often projects too far forward toward the pubis, and, by diminishing the size of the brim, retards labor seriously in numerous cases. Little more may be said respecting this bone, the fullest description being obtainable in anatomical treatises.

5. **The Coccyx, or Os Coccygis; Huckle or Knuckle Bone,** so called from its resemblance to the beak of a cuckoo, a kind of appurtenance of the sacrum. It is a small triangular bone, but very important obstetrically, because, from being highly ossified and anchylosed, as in females somewhat advanced in years, or of sedentary pursuits, and also owing to disease or accident, it causes obstruction at the outlet of the pelvis. It is usually movable, however, and, as the head comes down, it recedes from half an inch to an inch, thus enlarging the antero-poste-

rior diameter. During labor, when it is hard and unyielding, it sometimes gets fractured; at other times it becomes dislocated backward, causing no little pain until it is replaced. This little bone has often necessitated the use of the forceps.

6. **Os Innominatum.**—This bone is situated between the os femoris and sacrum, and constitutes the lateral and anterior boundaries of the pelvis. It is divided into three parts; the posterior and superior is named the ilium, the anterior, the pubis, and the inferior the ischium.

7. **Os Ilium.**—This is the largest bone of the three, and forms with its fellow the false pelvis. To its crista are attached the chief abdominal muscles concerned in parturition. The iliac fossa, which is lined with the iliacus internus muscle, forms a portion of the sphere on which the lower part of the pregnant uterus rests toward the close of gestation. At its junction with the pubis is the ileo-pectineal eminence. The line running from the tuberosity of the pubis to the promontory of the sacrum (linea ileo-pectinea) is the boundary between the false and true pelvis. The posterior part of the iliac crest joins with the sacrum (fibro-cartilage being interposed) to form the sacro-iliac synchondrosis.

8. The **Os Ishcium**, Os sedentarium, is next in size to the ilium, and is the lowest of the three bones. The external surface does not interest us as obstetricians, but the internal is of paramount concern. On this latter is the *inclined plane* of the ischium, the direction of it being from above downward, from behind forward, and from without inward. It is on this plane in part that the head of the fœtus rotates as it passes through the pelvic cavity. Another part of this bone must be referred to particularly—we mean the spinous process. We need not describe it, as the student has made its acquaintanceship when studying the bones. In some cases it is marked by abnormality, it is curved too much inward, and disturbs and arrests the descent of the fœtus. In this way labor may be vastly prolonged, and the life of the child jeopardized. The mother also may be injured by the undue extension of the labor, unless the accoucheur be a man of skill, decision, and dexterity.

9. The **Os Pubis**, pecten, or share-bone, forms the anterior wall of the pelvis, that is, with its fellow. From the lower part of the symphysis, and at a sharp angle with the horizontal ramus, a thin plate of bone, the descending ramus proceeds downward to join the ascending ramus of the ischium, and with it to form one side of the pubic arch. This is a part to be carefully noted, for upon the angle formed by these two bones, and the opposite two, depend the dimensions, the width or narrowness of the arch. Upon the narrowness or amplitude of this arch, moreover, may hang an easy or a difficult labor. Of the three foregoing bones, the ilium enters into brim and cavity, but not outlet; the ischium, part of cavity and outlet, but not of brim; while the pubic bones enter into brim, cavity, and outlet.

10. **Of the Articulations of the Pelvis.**—The joints of the pelvis are invested with much obstetric interest. We can only notice them briefly, but shall endeavor to point out all that it is important to know in connection with them.

11. **Sacro-iliac Synchondrosis.**—This is formed, as the student will know, by bone and cartilage. The layer of cartilage on the sacrum is thickest; and if the bones are forcibly separated, this substance remains attached to the sacrum. It is not a joint, strictly speaking. The union of the bones is not only closely effected by means of cartilage, but by strong ligamentous bands. These render the articulation quite immov-

able, unless very great force be applied. Further strength is imparted by the sacro-sciatic ligaments connecting the lower part of the sacrum with the ilium. We have seen two powerful men trying to sever this connection in the dissecting-room, but their efforts were unavailing. The student, then, should keep in mind the vast strength of this articulation, as an interesting question, to be afterward noticed, is connected with it. He should notice also the way the sacrum is fixed in between the iliac bones—like the key-stone of an arch, inverted. Its traverse diameter is greatest anteriorly, owing to the fact that the pressure which it has to withstand is from within.

12. **Symphysis Pubis.**—This is formed by the union of the pubic bones with intervening fibro-cartilage. This symphysis is not very strong, but it is fortified by the anterior and posterior pubic ligaments, consisting of fibres stretching across, and firmly adherent to both bones.

13. The **Sacro-Coccygeal Joint** is ginglymoid, and admits of considerable movement backward, unless when anchylosed, as before observed.

14. **Question of separation of Joints during Labor.**—For a long period, dating, in fact, centuries back, it was held that the pelvic bones separated during parturition ; in particular, anteriorly, at the symphysis pubis, as is found in some of the lower animals, such as the cow and guinea-pig. There is an eminent school, including such names as Paré, Chaussier, Gardien, Matthews Duncan, Sigault, etc., that still strenuously maintain it, while many not less distinguished authors strongly deny it. We have named Sigault last, but he is not to be deemed the least ; for, as we shall afterward see, he inaugurated an operation—the Sigaultian—founded upon the hypothesis of a normal separation of this joint during labor. We may state that we rather ally ourselves to the non-separationists, if we may use the term, and for the following reasons:—If these bones separated to an extent great enough to increase the cavity of the pelvis much, we could hardly expect the woman to recover so speedily as she usually does, but would rather find her feeble and bed-rid for several weeks at least. Further, the separation in ordinary cases is not necessary, there being abundant space for the passage of the child. Even if it did occur, little extra space would be given; for although the pubic joint was separated for an inch, only two lines of antero-posterior increase would be obtained. Lastly, the separation could not take place without a rupture of the pubic ligaments, and those of the sacro-iliac articulation—accidents which would assuredly entail on the woman locomotive incapacity for a good while at least—a rare sequence.

But though a separation be denied, it cannot be doubted that a relaxation of the symphysis does take place. The articulations, too, are liable to inflammatory action and suppuration; but then these are not natural phenomena, but pathological conditions, which are attended by marked signs and symptoms, For example, in disruption of the pubic and sacro-iliac articulations we should find the patient unable to stand, or walk, or sit upright, or assume the erect posture without much uneasiness and difficulty.

15. **The Pelvis as a whole.**—We have before pointed out the position of the pelvis, and the advantages accruing therefrom, and now notice the pelvis itself. It is divided by the *linea ileo-pectinea* into the false and the true. The latter mainly concerns us; it is the part concerned in labor, and is worthy of careful study. It is divided into brim, cavity, and outlet. The brim, or inlet, or superior strait, which is nearly a

plane, consists of an irregularly curved, prominent line, its elevation being greater behind than in front. It begins at the middle of the sacro-vertebral promontory, and descends obliquely along the lower border of the iliac fossa; it then curves round and approaches the pubis, where it ends in the sharp linea ileo-pectinea. The form of the brim has been differently described by different authors. It has been called round, triangular, and elliptical. The most important points connected with it are the symphysis pubis, the acetabula, the sacro-vertebral promontory, and the sacro-iliac symphyses. The brim has much to do with parturition. It is often so much contracted or deformed as not only to hinder, but to prevent the descent of a mature fœtus altogether. Deviations in its form or dimensions, moreover, generally entail the same on other parts of the true pelvis. The chief diameters are (1) the antero-posterior or conjugate, which stretches from the prominence of the sacrum to the inner and upper edge of the pubic symphysis; (2) the transverse, which extends across the widest part of the brim at right angles to the conjugate; (3.) the oblique, which goes from the sacro-iliac synchondrosis of one side to the opposite side of the brim, right above the acetabulum.

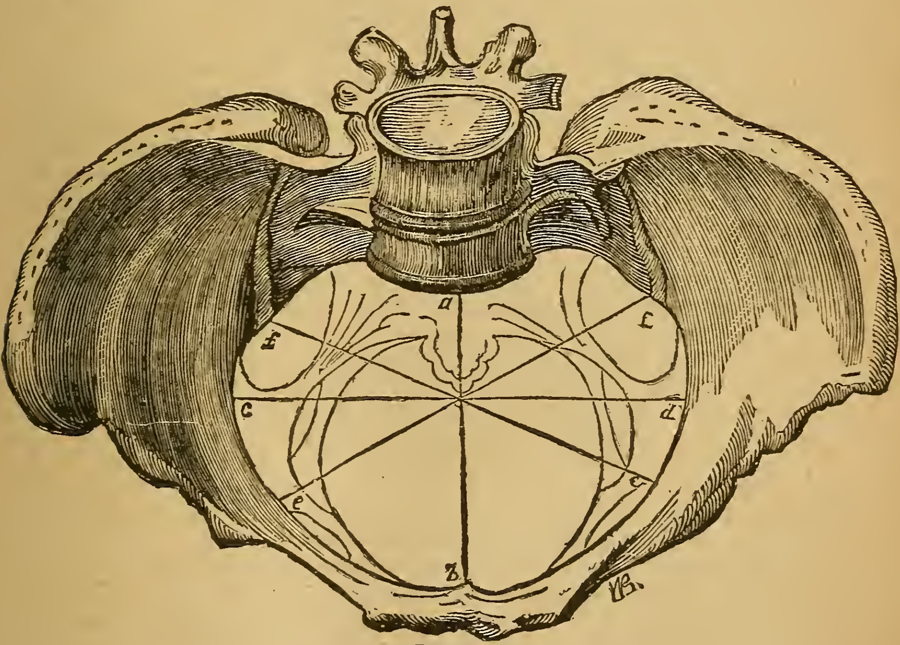

FIG. 2.

The length of these different diameters is differently stated, but the following are the measurements commonly given:

Measurements of Brim of True Pelvis.

Antero-posterior diameter,....	4 in.	Fig. 2,	*a* to *b*.
Transverse "	5 in.	"	*c* to *d*.
Oblique "	5 in.	"	*e* to *f*.

16. **Cavity of the Pelvis.**—This varies in depth considerably. Behind, it is about 5 in. deep; then it becomes gradually shallower till we reach the front, where we find it about 2 in. The diameters are—antero-posterior, from hollow of sacrum to symphysis pubis, $4\frac{1}{2}$ in.; traverse, at right angles with the above, $4\frac{3}{4}$ in.; and oblique, about 5 in. Other measurements of the cavity are important. For example, from the sacro-iliac symphysis of one side to the tuber ischii of the other, is 6 in.; and to the ramus of the ischium, 5 in. From the anterior margin of the sacro-sciatic notch to the opposite side is 6 in.; from the anterior margin of the descending ramus of the ischium, same level, is $4\frac{8}{4}$ in.

Measurements of Cavity of True Pelvis.

Antero-posterior diameter,	$4\frac{1}{2}$ in.
Transverse "	$4\frac{8}{4}$ "
Oblique "	5 "

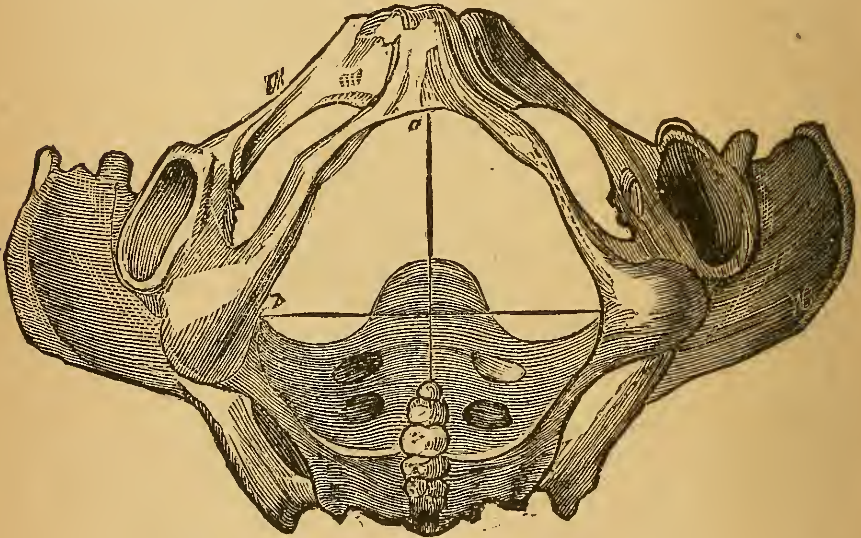

FIG. 3.

17. **Outlet of the Pelvis, or Inferior Strait.**—(See Fig. 3.) The outlet is somewhat oval in shape, but more irregular than the brim, owing to the forward projection of the coccyx posteriorly, and the arch of the pubis in front. This arch forms an angle of between 90° and 100°, and will allow of the exit of a circular body whose diameter is $1\frac{1}{4}$ in. The diameters of the outlet should be well noticed. The figures are very similar to those of the brim, but the diameters are reversed. What is the short at the brim is the long at the outlet. They are as follows:

Measurements of Outlet of True Pelvis.

Antero-posterior (from point of coccyx to arch of pubis), 5 in.
Transverse, between ischial tuberosities, 4 in.
Oblique, between sacro-sciatic ligament and ascending ramus of ischium, 5 in.

The antero-posterior of the outlet may be increased a little, owing to the flexibility of the coccyx. The outlet is not exactly a plane; it is rather two planes.

18. **Axes of the Pelvis.**—The axes of the pelvis are two, one of the brim, and one of the outlet. If, in the case of that of the brim, the imaginary line were extended, it would touch the umbilicus above, and the coccyx below. (See fig. 1.) That of the outlet is downward and forward from the promontory of the sacrum to the centre of the space between the ischial tuberosites. The two lines cross each other at a considerable angle. A knowledge of these axes is of much service to the accoucheur, for he is enabled thereby to place the patient in the most favorable position for delivery. In instrumental cases, too, delivery may be facilitated by keeping them in mind, just as failure, and probably damage to the patient, may result from neglecting them.

19. **Planes of the Pelvis.**—The planes of the pelvis deserve notice, seeing that they have an important influence during the descent of the fœtus. "They are imaginary levels stretching between certain corresponding points of the pelvis." Three planes deserve attention, viz.:—the plane of the inlet, or superior plane; the inferior, or that of the outlet; and a third, termed by Tyler Smith the mid-plane. The plane of the inlet, which is bound by the linea ileo-pectinea, is inclined to the horizon at an angle of about 60 degrees in the female, according to Naegelé; that is, in the unimpregnated condition. The mid-plane has an inclination to the horizon very much greater than the superior one. The inferior plane, which extends virtually from the lower margin of the symphysis pubis to the apex of the sacrum, owing to the mobility of the coccyx, has an inclination to the horizon of about 16°. If the extremity of the coccyx be taken, then the inclination will only be about 10°. These various planes, while varying in their relations to the horizon, and to the spinal column, according as the female is pregnant or not, always stand in the same relation as each other. From this the important result follows, that the axes of the planes of the pelvis are fixed, and the passage of the fœtal head, under ordinary circumstances, must also be the same.

20. **Difference between the Male and Female Pelvis.**—The accoucheur, if he did not otherwise know, would very soon and readily pronounce that the male was not a child-bearing person, just from an examination of his pelvis. It is not adapted for the great function, being "cribbed and confined." In the male pelvis the sacrum has not such a depth of concavity; it approaches more to the perpendicular, the coccyx is less flexible, and the tuberosities of the ischium approach nearer each other. The depth of the symphysis pubis is much greater; the pubic arch is less wide, its angle being about 75°, and the sacro-sciatic notches and foramina are much smaller. The brim of the pelvis approaches more to the circular shape, and its cavity is deeper.

21. **Soft Parts of the Pelvis.**—In the iliac fossa is the internal iliac muscle, and internal to it is the psoas muscle. Near the inner border of this latter muscle are the iliac artery and vein, and the crural nerves and lymphatics. In the cavity of the pelvis are the obturator internus muscle, and the pyramidalis, the hemorrhoidal and sacral vessels, and the sacral nerves. Then behind is the rectum, and in front the bladder. The lower strait or outlet is nearly closed in by the following structures: Sacro-sciatic ligament, coccygeus muscle, fascia, and cellular membrane.

The pelvis thus contains a good deal of material; but so skilful a packer is Nature that it is found that the diameters of the pelvis are but little diminished thereby; only, in fact, from ¼ to ½ in. Of course, compression during labor diminishes them too.

22. **External Measurements of the Pelvis.**—A knowledge of these is useful in regard to the diagnosis of deformities, as external abnormal deviations generally imply internal ones. Here are Naegelé's:—

External Measurements of the Pelvis.

1. From the tuber ischii of one side, to the post.-super. spinous process of the opposite side, is 6 in. 6 lines.
2. From the anter. super. spine of the ilium of one side to the post.-super. spine of the other side, 7 in. 10 lines.
3. From the spinous process of the last lumbar vertebra, to the ant. super. spine of ilium of either side, 6 in. 8 lines.
4. From the great trochanter of one side, to the post.-super. spine of the ilium of the opposite side, 8 in. 2 lines.
5. From the centre of the infer. edge of the symph. pubis to the post.-super. spine of ilium of either side, 6 in. 4 lines.

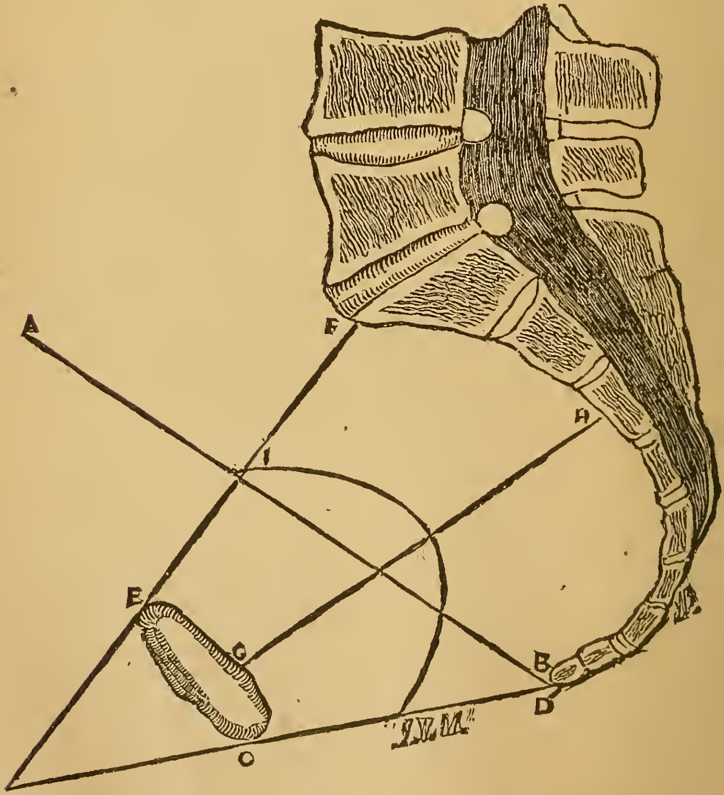

FIG. 4. A to D, Axis of upper strait or brim. C to D, plane of outlet. E to F, plane of brim. G to H, mid-plane. I to J, curve of Carus, or the path traversed by the fœtus in its passage through the pelvis, and which should be well kept in mind during all kinds of artificial delivery.

23. **How to Measure the Pelvis—Pelvimeters.**—The eye may detect a marked external deformity. We may contrast the width of the hips with that of the shoulders, the particular inclination of the pelvis, and the curve of the sacrum, and thus obtain a fair estimate of the make of the female—the symmetry, or want of it, of the parts; but a more satisfactory method is by the employment of curved calipers.

The internal measurement, which is the most important, is also the most difficult to accomplish. Various pelvimeters have been invented. There are Baudelocque's, Coutouly's, Chaussier's, Lazarawitch's, and Greenhalgh's; but the best pelvimeter is the hand. I for one always feel that, if possible, we should avoid wood or steel; that is, if any piece of obstetric work can be thoroughly done by the hand, it is to be preferred.

24. **The Hand the best Pelvimeter.**—Instrumental pelvimeters cannot be employed without occasioning more or less pain to the female; besides, they do not give us such correct and certain results. The finger, or as it is termed by the French, the *toucher*, is therefore to be preferred. The best method is this: Carry two fingers of the left hand within the vagina; place the free end of the first finger precisely behind the symphysis pubis, and the point of the second finger against the promontory of the sacrum. It is seldom but what one can extend the fingers sufficiently for this, even in normal cases. The fingers are then to be carefully withdrawn, and their position maintained until the space betwixt the two extremities is ascertained by compasses or a measure. This plan can be carried out even when the head has descended somewhat into the pelvis, for the fingers may be pushed up between it and the pelvic wall. Another plan I have adopted in some cases of contracted brim is this. I have introduced the whole hand into the pelvis, and pushed it up between the symphysis pubis and the sacral promontory. As one knows, or may readily know, the breadth of one's hand, the antero-posterior diameter may be made out by the number of fingers admitted. If your hand just fits it, it does not look very promising; but if, say, only two fingers are admitted, it is serious indeed. In a normal case, the hand readily passes up without impinging either in front or behind. More than once I have thus been able early, and before a patient has been too much exhausted, to find out the necessity and unavoidableness of craniotomy. Choloroform facilitates greatly the internal measurement of the pelvis.

25. **Pelvic Deformities and Abnormalties.**—A knowledge of the deviations of the pelvis from its normal size or shape is of the utmost importance, because these deviations always affect parturition more or less, and sometimes render it a dangerous and even fatal process. In some few very extreme cases it is even made impossible by reason of them. The abnormal deviations have been divided into the general and special, the former embracing those cases where there is either imcreased or diminished capacity. Those where there is an excess of room—the *pelvis æquabiliter justo major*—are not uncommon; while those where there is an equal diminution of space—*pelvis æquabiliter justo minor*—are a good deal rarer. In the case of the equally large pelvis—that is, one where all the diameters are in excess—one would imagine that it would be a pelvis highly favorable for easy parturition; and perhaps, as a rule, this is the case: but there is this defect attaching to it, that it may not afford that contract at different points which is necessary for producing the rotations of the fœtal head. But the chief disadvantage of the over-large pelvis is this, that it favors the prolapse of the pelvic viscera. We may

have retroversion or anteversion; prolapsus uteri, and also displacement of the bladder. During the latter part of utero-gestation, moreover, owing to the head gravitating low down into the pelvis, we may have troublesome pressure on the rectum, bladder, and pelvic nerves, giving rise to bearing-down sensations, painful micturition, hemorrhoids, constipation, and crural and sciatic neuralgia. We may notice also that cases have occurred where the child was expelled so suddenly that flooding resulted, owing to inertia of the uterus. The umbilical cord, too, has been found to be ruptured; and more grave still, there may be a risk of rupture of the cervix uteri itself, the fœtus coming down so impetuously as to carry it away before it had time to dilate properly.

As regards the equally small pelvis, which is generally due to rickets, the resulting disadvantages are pretty obvious. In some cases the forceps may be necessary; in others, craniotomy. As regards the diameters of these two classes, the small one is generally lessened throughout by about ¼ in.; while the large one may have its diameters increased by from ¾ to 1½ inches.

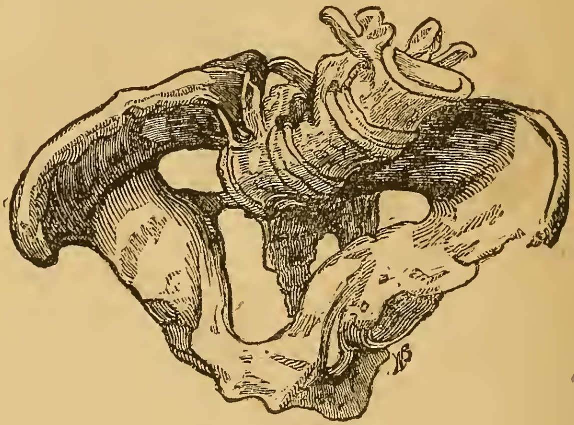

FIG. 5.

26. **Special Deformities of the Pelvis.**—Deviations from the normal size and distortions may occur at the brim, cavity or outlet. The decrease in the diameter may exist in all three, or only at one part, such as the brim, which often happens. On the other hand, a diminution at one part sometimes necessitates the same at another part. They are most frequent at the brim—conjugate diameter—and at the transverse of the outlet. Those at the brim consist of an approach of the sacrum toward the pubic symphysis, or of the latter to the former. In some instances there is, in addition to this pushing forward of the sacrum, a driving in of the acetabula, resulting in oblique as well as antero-posterior diminution, and consequently a highly distorted brim. The pelvis of Isabella Redman, who was operated on by Dr. Hull, was a sample of this kind of deformity. (See fig. 5.) In some cases the diameters of the brim are reversed, the conjugate being longest, and the transverse shortened. (See fig. 6.) Thus the oval of the brim is transposed. This condition, as has been ably shown by Matthews Duncan, marks the malacosteon pelvis. (See fig. 7.) In the cavity, deformities and diminutions

often arise from the sacrum being too little curved, the other parts of the pelvis being natural. Distortion is occasioned also by growths from the sacrum, osseous or fibrous. There are instances where an exostosis has impelled to the performance of the Cæsarian section. Other causes of deformity are fractures of the pelvis, extensive ulcerations of the acetabula, and morbid growths in different parts of the cavity.

Sometimes the arch of the pelvis and the symphysis are of a male character, but this is rare.

27. **Funnel-shaped Pelvis.**—This is not a very common variety. In this case the cavity contracts gradually from the brim to the outlet, giving it somewhat of a funnel shape.

At the outlet, diminution is most common in the transverse diameter. The tuberosities of the ischium approach too near each other, and narrow also the width of the pubic arch. In this way, in addition to the transverse diameter, the antero-posterior is also lessened. Anchylosis of the sacro-coccygeal articulation, and a too great curvature of the lower part of the sacrum forward, diminish the outlet also antero-posteriorly.

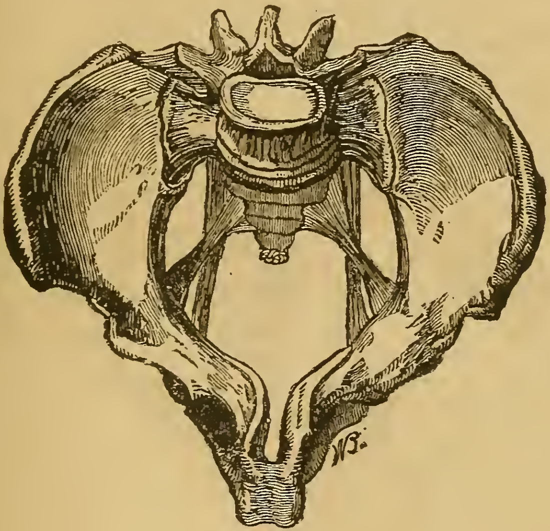

FIG. 6.

28. **Naegelé's Pelvis,** or the obliquely distorted pelvis—*oblique ovata.*

In the majority of cases of distortion or diminution, the fault, though not in an equal degree, attaches to different parts or sides, but in this case it is one-sided. Naegelé first directed attention to it, and published a monograph brimful of research on the subject. The learned professor collected no fewer than 37 cases of this malformation, nearly all belonging to females. This oblique distortion consists of, or rather is due to, the absence of the sacro-iliac synchondrosis. On the affected side, which in a small majority of Naegelé's cases was on the right, there is complete anchylosis of the sacrum and innominate bone, and not the slightest trace of articular cartilage is to be discovered. The sacrum, moreover, is imperfectly developed, and somewhat crooked. As a consequence, the sacral promontory and pubic symphysis are not opposite to each other, the latter being inclined more to the right side of the pelvis, and the former to the malformed side. The pelvic axes and planes are much altered, and for the worse. Indeed, Naegelé says that in almost all the cases which he collected fatal results followed to both mother and child. This eminent man held the view that the deformity was congenital; others think it a result of inflammatory action and ulceration.

29. Other deformities are caused, and obstacles to labor occasioned, by spiculæ of bone on the edges of the different symphyses, and along the ileo-pectineal line. These are, according to Kilian of Bonn, who has devoted attention to them, just a hypertrophy, or increase of the size of natural parts. Kilian has also described a form of distortion produced by disease and displacement of the lumbar vertebræ, leading to encroachment on the area of the pelvis—Spondylolithesis. . Dislocation of the hip-joint and anchylosis due to morbus coxarius, have also led to pelvic deformity.

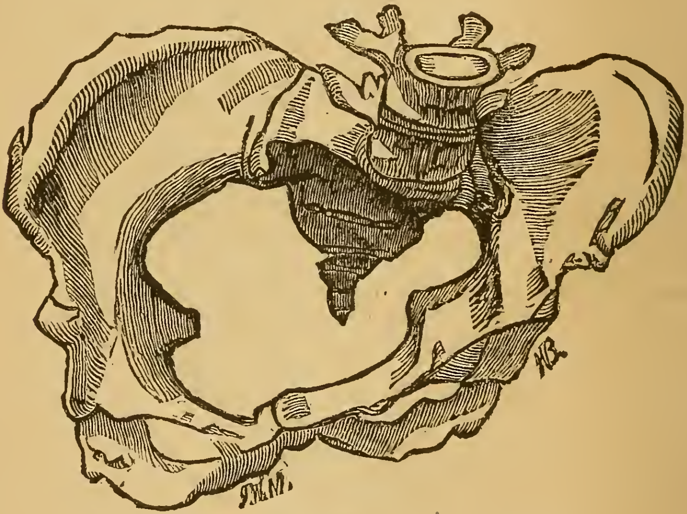

Fig. 7. Naegelé's Pelvis ; or, the oblique ovata.

30. **Causes of Pelvic Deformity.**—The chief causes of pelvic deviation and distortion are Rachitis, or Rickets, and Mollities Ossium, or Malacosteon.

Rickets is a disease of infancy, and is due to a deficiency of the earthy matter of the bones, which want renders them soft and flexible, and unable to sustain aright the superincumbent weight of the body, or other pressure. For instance, if the patient maintain the sedentary posture long, the sacral promontory may be forced forward, or the lower part of the sacrum and coccyx may be driven inward, and become almost horizontal. If the erect posture be long maintained, the acetabula may be driven in, and the sacral promontory in the direction of the pubis.

31. **Malacosteon,** which also consists of a softening of the bones, is a disease of the adult. An important consideration in connection with this disorder is this, that it seldom occurs but in women who have

borne children. In this way it may happen that a female who has given birth to several living children shall have to be delivered by craniotomy, or even by the more terrible and fatal operation of abdominal section. In Malacosteon the stature is shortened, and there may be various spinal distortions. Here it may be observed that distortion of the spine does not necessarily lead to pelvic deformity; the two are frequently but not invariably associated. As might be expected, both in the case of Rachitis and Malacosteon, the site and nature of the deformity depend on the strength of the pressure to which the pelvic bones are subjected, and the direction in which that force is applied.

CHAPTER II.

OF THE GENERATIVE ORGANS OF THE FEMALE.

32. The female organs of generation are commonly divided into external and internal. The former consist of the mons veneris, the labia majora and minora, clitoris, hymen, and vagina; and the latter of the uterus, the ovaries, and the Fallopian tubes. We begin with the external.

Mons Veneris.—The mons veneris is a triangular cushiony prominence placed in front of the symphysis pubis, and at puberty covered with hair. In females much beset with adipose tissue, it is very bulky and prominent. It is made up of fat, and fibrous and areolar tissue. The use of this eminence is matter of doubt. That it is meant to guard the pubis from mechanical violence during intercourse, seems a plausible explanation. Commonly the hair covering it is short and curled; but in barren women it has been noticed to be straight, and shorter or longer than usual. When this condition exists, it would seem to indicate an imperfect development of the internal generative organs. It is at times the seat of abscess, of cutaneous eruptions, and the *nidus* of pediculi.

33. **Labia Externa, or Majora, or Pudendi.**—These are two duplications or folds, skin externally, and mucous membrane internally, extending downward from the sides of the mons veneris to the fourchette. At their junction above they form the anterior commissure, and they inclose the external organs of generation. They are thickest and broadest above, and become gradually thinner as the distance from the commissure increases, until they disappear at the inferior commissure. Their internal or mucous membrane is a continuation of the vaginal, and it is endowed with a good deal of sensibility. Between the skin and lining membrane the structure consists of adipose and areolar tissue, fascia, nerves, blood-vessels, and glands. These latter, which are very numerous, are sebaceous and mucous, and secrete an odorous fatty matter and lubricating material, which diminishes, or protects from the evils of friction. The labia are very elastic and distensible, and therefore during labor expand immensely without being lacerated. Sometimes, both in the gravid and non-pregnant state, the secretion of these glands becomes perverted, and is of an acrid nature, producing irritation and excoriation

of the labia. And an important matter in connection with this is the fact, that a discharge similating gonorrhœa may be produced in the male who has connection while this abnormal secretion exists. The practitioner will frequently be consulted by married men suffering from a muco-purulent flow from the penis, and who have had no intercourse with any beyond their own chaste spouses. They look the picture of melancholy and indignation; and no wonder: for, in addition to the pain occasioned by their pseudo-gonorrhœa, which, however, is not very great, they suffer from a sadly perturbed mind, believing that their wives must have been guilty of illicit connection. They will say to you: this is most extraordinary and unaccountable; they have not strayed from the legitimate path, and they have sad fears and doubts as to the fidelity of their wives. In such circumstances it is better at once to tell the patient that he may have such a discharge and yet his wife be unswervingly true; that there is such a flux apart from venereal infection. Within the posterior commissure is a fold of mucous membrane called the fourchette, which rarely escapes laceration in primiparous cases. During labor a depression may be felt between this fold and the edge of the perinæum; it is termed the fossa navicularis.

34. **Cowper's Glands.**—These are the most important of the vulvo-vaginal. They are about the size of an almond, and are placed on each side of the orifice of the vagina. They secrete mucus, and are occasionally the seat of abscess. The function of the labia is to facilitate the expansion of the external opening during labor.

35. **The Labia Interna or Minora, or Nymphæ,** are placed just within the external labia. They extend from near the superior commissure to near the middle of the orifice of the vagina. They are folds of mucous membrane, and between these coats are areolar and vascular tissue and nerves. They are named nymphæ because they were supposed by the older authors to direct the course of the urine. They mantle the clitoris and the urinary meatus. The internal labia increase the secretory surface, but can do little in the way of increasing the capacity of the vulva during labor. Sometimes they become hypertrophied, and project beyond the external labia. Dr. Bedford mentions a case where, during labor (so large were they), a practitioner fancied that he was dealing with a breech case, the labia being mistaken for the scrotum and testes.

36. **Clitoris.**—The clitoris is a small mass of erectile tissue, situated below the symphysis pubis, and between the labia externa. It consists of two corpora cavernosa, attached by crura to the rami of the ischium and the pubis, and uniting in the middle line. Each of the bodies is covered by a fibrous sheath. The organ is imperforate, but there is a spongy bit in front, called the glans, covered by integument, hardly worth the name of prepuce. It possesses two muscles, the erectores clitorides, arising from the pubic and ischial rami, and which are inserted into the crura. A suspensory ligament also connects the clitoris with the pubis. It is *the analogue* of the penis in the male; is capable of much erection; and is the principal seat of sexual sensibility. As Dr. Meigs has it, "it is the organ of touch to the aphrodisiac sense." In some females (hysterical) it is liable to almost constant erection, and in this state, when extreme, it offers an impediment to micturation. Hence, in those women, it is often necessary to use the catheter. Dr. Tyler Smith notices an upward displacement, or dislocation, of it, which is common in those women who indulge in the

deplorable habit of delectation, or self-abuse. When such females marry, the sexual orgasm during coition is often wanting, partly as a result of this displacement. Small as is the clitoris, we may state that big events have hung upon it. It has had tremendous importance assigned to it by some surgeons, who have declared most earnestly that a long train of nervous disorders—hysteria, epilepsy, catalepsy, and insanity—have sprung solely from the irritation of it (the peripheral irritation of that part of the pudic nerve supplied to it). This irritation they say, is due to self-abuse; and as the habit is deemed almost ineradicable, they recommend the excision of the clitoris as the only radical cure. The chief apostle of this view being deceased, the practice has fallen into desuetude; and this can scarcely be matter for regret, for doubtless there was a growing tendency to have this small organ excised unceremoniously and wholesale. Treatment of those nervous disorders is rather in the direction of moral means, keeping the patient somewhat under restraint; and medical, such as the internal use of bromide of potassium. Then the clitoris may be touched with caustic or cantharides, so as to render it too painful for the patient to handle. If those nervous maladies do depend on the irritation of this organ (which may be doubted), then, by thus stopping the habit, benefit may result.

37. **Vestibule.**—Between the nymphæ, and below the clitoris, is a smooth groove about an inch long, termed the vestibule. It is pointed above, and broadens out below. It is worthy of notice as a guide to the meatus in catheterism.

38. **Introduction of Catheter.**—A few words may be said here in reference to the introduction of the catheter, as the student may frequently be called upon to do it, either during labor, during pregnancy, or in cases of uterine and pelvic tumors. It is better to introduce the catheter without exposing the parts, but this cannot be easily done without practice, more especially if, as often happens during labor, these parts have become tumefied. We have known the student try it for a while without uplifting the bed-clothes, but be fairly baffled. He has then had to expose the vulva. Now, this awkwardness might be avoided by attention to a few rules. The woman being in the ordinary position, the student will bring his index finger down the pubis, then within the vulva to the anterior commissure, feel the clitoris, then down the vestibule to the bottom, when by pressing the finger in with tolerable firmness, the little firm circular orifice of the urethra will be felt. Another way is by feeling for the upper part of the pubic arch, and pressing the finger up against its keystone, as it were, when the little opening is readily detected. Pass the catheter over the point of the finger, worm it into the aperture, slightly depressing the handle of it at the same time. Occasionally one of the mucous ducts, near the meatus, may become enlarged sufficiently to admit a catheter, and thus the student may get into a *cul-de-sac* instead of reaching the bladder. The novice, too, will frequently pass it into the vagina, or even into the uterus itself, discovering his mistake, perhaps, when he finds no response of urine. A long flexible catheter is very convenient, as it more easily reaches the receptacle for the urine, and the bed-clothes are thus less likely to be wetted.

39. The **Urethra** need not be described here, being fully dwelt on in anatomical works; it may simply be stated that its length is about 1½ in., and its direction obliquely from before backward, and from below upward. It runs under and behind the symphysis pubis, some cellular

tissue being interposed. It is highly dilatable, and calculi have been removed through it from the bladder. Stone is less frequent in the female, partly because any nucleus readily escapes through this more distensible canal.

40. **Ostium Vaginæ.**—Just below the meatus is the ostium vaginæ. Normally, it is somewhat oval in shape. In the virgin it is partly closed by a membranous fold called the hymen.

41. **Hymen.**—This is a fold of membrane, usually delicate, of semilunar or crescentic shape; the horns of the crescent being directed upward and forward. This fold divides the external from the internal organs. Sometimes it is marked with small punctures; at other times it is serrated or cribriform. Occasionally there is a central opening. Cases occur where it is imperforate, and this gives rise to complications after puberty, such as retention of the menses and other secretions. Intercourse generally easily ruptures the hymen, but sometimes it is unusually thick and tough, and requires to be incised by the surgeon. In some instances, instead of rupturing, it has simply been pushed backward or upward during intercourse, and had to be incised during labor, that is, where it formed no obstacle to the entrance of the semen: in other cases it has debarred this, and led to the idea of sterility. Prostitutes have been met with in whom the membrane was intact. As insemination and conception may take place without it being ruptured (that is, in those cases where it is cribriform, or where there is a small aperture), therefore it is no certain test of virginity. "All modest maids," says Dionis, "cannot give their new spouses this proof of virginity and virtue, for occasionally it is absent from no fault of their own." It may be added under this head, that instances are not uncommon where, when the hymen has been imperforate, the menstrual discharge has accumulated to such an extent as to give rise to a suspicion of pregnancy. In these cases an incision has to be made, and the fluid, which is often dark and glairy, evacuated.

42. **Carunculæ Myrtiformes.**—When the hymen is swept away, its place is commonly occupied by fleshy eminences (4 or 5 tubercles), named as above. Some hold that they are the remains of the hymen; others say that they are just reduplications of the mucous membrane which existed prior to the destruction of the hymen. About the site of these folds or eminences there is a good deal of contractile tissue, and sometimes there is spasmodic contraction of the part so painful as almost to preclude coitus.

43. **Perinæum.**—This is a word that the obstetric student will hear often. The perinæum is the space between the margin of the anus and the posterior commissure. Its shape is somewhat triangular, and its length is from 1 to 2 in., but during labor it stretches considerably, say to the extent of 3 or 4 inches. One will sometimes be quite struck by the way in which it thus thins out and distends, just like a piece of india-rubber. It is marked in the center by a prominent line, the "raphé." Anteriorly, at the fourchette, it is thin; posteriorly, toward the anus, it is thicker. It is made up of skin, cellular membrane of a highly distensible nature, muscles, and the vaginal mucous membrane. The muscles are all inserted by one extremity into fascia, or tendinous structure: an arrangement which facilitates their dilatation. A peculiarity of these muscles, moreover, and which also favors distension, is, that they are blended with a good deal of elastic dartoid tissue. When the perinæum is much longer than usual, the risk of laceration during labor is

increased. Its function is to support the pelvic viscera, and to offer, at the same time, an elastic and distensible medium during the expulsion of the child.

44. **Vagina.**—This is the avenue leading to the uterus. It is a somewhat curved canal, the concave surface being upward and forward. Its direction approximates closely to that of the outlet of the pelvis. Its posterior wall is longest, being about 5½ in.; the anterior is only about 4 in. The canal is longer in the virgin, and those who have not borne children, than in those who have been gravid. It is longer in the middle months of the pregnant state than about the beginning, or near the end of pregnancy. It is lengthened out, too, in some cases of fibrous and ovarian tumors, where the uterus is dragged up by these. Its diameter varies in various parts of its course, being least at the outlet. When undisturbed, its walls are in contact; this serves the important purpose of excluding the air from the uterus, the entrance of which, as we shall afterward see, is fraught with danger. It possesses an external, middle, and mucous coat. The external consists of cellular tissue, connecting it in front with the bladder and urethra; posteriorly, with the rectum and peritoneum; and, laterally, with the *levator ani*. It touches the peritoneum in the posterior wall, upper part, where the former dips down between the vagina and rectum. The middle coat is fibro-cellular, and more dense than the external; in fact, it is a continuation of the fibro-cellular tissue of the uterus. Cruveilhier and other anatomists say that it resembles the dartos. The mucous membrane is of a pink hue, and is marked in the mesial line anteriorly and posteriorly by transverse rugæ, which enable the vagina to distend to a great extent. These folds become almost obliterated in women who have borne children, and also in advanced age. The mucous surface is dotted thickly with vascular papillæ (seen under the microscope), and well described by Kilian. These probably confer on the vagina its peculiar sensibility. The epithelium is squamous or tesselated. Mucous follicles exist, but they are not so numerous as was once thought, except at the outlet of the vagina. The mucus which lubricates the canal, therefore, is most likely produced by the epithelium. The secretion, as shown by M. Donné and others, is of an acid nature. The object of this acid is to prevent the coagulation of the menstrual fluid as it traverses the vagina. Were it coagulating there, its free outflow would be impeded, and irritation and other complications would follow. It is also said to be antiseptic, thus preventing the decomposition of the fluid by those germs discovered by M. Pasteur, and on which so much stress, justly or unjustly, has been laid by Lister and others. Near the mouth of the vagina is some erectile structure, constituted by a plexus of veins, There is also the sphincter vaginæ muscle, a fasciculus of which crosses the vena dorsalis, and helps to promote the turgescence of the clitoris.

45. **Functions of the Vagina.**—1. It is a canal for the passage of the menstrual secretion. 2. For the transmission of the fœtus. 3. It is an avenue for introception, and the ascent of the seminal fluid. 4. Organ of sensation.

It possesses contractile power, voluntary and involuntary. This is exerted strongly during labor; less so during the passage of clots, in menorrhagia, polypi, etc.

46. **Coition.**—In regard to the physiology of coition, some authors, such as Müller and Carpenter, have denied the existence in the female of a sensorial orgasm; others, like John Hunter, believe in it. The

sexual paroxysm begins in the clitoris, and ends in a sensorial orgasm; the clitoris, as Dionis has it, being the seat of that great pleasure which women have in the venereal act. Some of the older physicians held the view that women in whom the venereal orgasm was wanting were sterile; but this is not the case.

CHAPTER III.

INTERNAL ORGANS OF GENERATION.

47. The **Uterus, Matrix, or Womb,** is the most important of the internal organs of generation. It receives and gives lodgement to the ovum, nourishes it until mature, and then effects its expulsion. It is placed at the upper part of the vagina, in the middle of the upper part of the pelvis, with the bladder in front and the rectum behind, its upper edge appearing slightly above the pelvic brim.

The shape of the unimpregnated uterus is pyriform, or, as older writers say, like a flattened pear; it is rounder posteriorly than anteriorly. In length it is about 2¾ in.; in breadth, at the widest part, about 1¾ in. At the cervix it is about an inch. It is about an inch thick from before backward, and its walls at the thickest part are about half an inch diameter. The weight of the organ is about 7 drams. At the lower part is the os uteri, or mouth of the womb. It has two lips, an anterior and a posterior. It approaches the oval in shape, its diameter transversely being greater than from before backward. The posterior lip is obscured rather by the anterior, which depends a little lower. The opening or slit is transverse, the external angles being turned a little backward, like the mouth of a fish: hence the name *os tincæ* which is sometimes given to it. Above this is the cervix, and higher the body, the upper part of which is called the fundus. The canal of the cervix leads from the os uteri, is about ¾ in. long, and of a fusiform shape. It widens a little above the os, and then contracts again at the junction of the cervix with the body. It is flattened from before backward. The mucous membrane which lines it is arranged in a peculiar manner. There are rugæ arranged transversely in columns (4 in number, with about 15 folds in each), commonly called the arbor vitæ. The rugæ are separated by four sulci or grooves; two divide the anterior from the posterior walls, and the other two occupy the middle line of both walls. They are well seen when the cavity of the cervix is laid open. Both on the rugæ and the intervening spaces are almost innumerable (10,000) mucous follicles; so many, indeed, as, according to that able observer, Dr. Tyler Smith, to constitute the cervix an open gland. These rugæ secure extensive dilating capacity during the growth of the contained body, as well as during labor; and the follicles or cysts supply the secretion which excludes the atmospheric air, which promotes the transmission of the spermatozoa, and serves as a plug during the gravid state. During labor also they secrete the mucus which lines, lubricates, and softens the os and vagina. The mucus is of an alkaline character, that of the vagina, as before said, being acid. This alkalinity ceases where the cylindrical epithelium ends, it being the squamous which secretes the acid mucus.

The cavity of the body of the uterus is triangular in form, the apex being below, and the base above. At the upper angles the Fallopian tubes pierce the uterus. The thinnest part of the uterine parietes is here, the greatest diameter being at the middle portion of the fundus, and the walls of the body opposite the centre of its triangular space.

48. The **Mucous Membrane** lining the cavity of the body is worthy of careful notice. It is about a line in depth, and is of a rather pale color. Under the microscope numerous points are seen, which are the openings of the follicles. These glands resemble the follicles of Lieberkuhn in the intestinal canal. They are tubular, and coiled upon themselves, and are about 1-30th of a line in diameter. They are arranged concentrically, their mouths opening on the mucous surface, and their blind extremities being embedded in the attached surface. Two sometimes open on the mucous surface by one outlet. The function of these follicles is still an open question. The late distinguished and lamented Goodsir, the eminent Sharpey, and the no less able Kölliker, believe that they prepare the material out of which the decidua reflexa is formed; others think they secrete the menstrual fluid; while some again affirm that they simply secrete mucus. The discharge in leucorrhœa is said by some to proceed from these glands. The epithelium carpeting the mucous surface in the cavity of the body is cylindrical and ciliated. The cilia wave from below upward, and aid the ascent of the sperm cells. In the cavity of the cervix the cilia are often absent. At the inferior part of the canal of the cervix, just at the margin of the os, the cylindrical and acid-secreting epithelium terminates, and the squamous begins. The entire vaginal surface of the os and cervix is covered by this latter.

Papillæ.—Beneath the epithelium are numerous papillæ or villi. A single villus is made up of one or two looped blood-vessels, and an envelope of cellular substance, all being coated with epithelium. At the os they are supposed to be endowed with special sensation of a sexual nature. They are perhaps also excitors of reflex action.

49. **Substance of the Uterus.**—The structure of the middle coat is made up of connective tissue, and elongated fusiform fibre cells. The diameter of these cells is about 1-4000th of an inch. In length they are rather greater. In the virgin uterus, uninvaded by disease—in the normal state of the organ—these fibre cells remain of the same size and character; but during pregnancy, or the existence of the polypi, or fibrous tumors, or even during the presence and irritation of a foreign body, they abandon the embryonic state, and enlarge and multiply in a remarkable manner. In thus enlarging and developing, they confer on the uterus a greater contractile power. We use the term greater, because some deny that the undeveloped fibres possess muscular properties. That they are endowed, however, with contractile power is seen in cases of membranous dysmenorrhœa, where the membrane is extruded by their influence. Pettigrew found that the fibres are looped round each other, and that in contracting they twist, and afterward resume their former state.

50. **Vessels of Uterus.**—Four arteries, viz., two spermatic, or ovarian, and two uterine. The lower part is supplied by the uterine, and the upper by the ovarian. They run a tortuous course, and join freely. The veins are the same as the arteries; they are without valves, and possess very thin walls. Like the arteries, they become enlarged during pregnancy; in fact, they are large sinuses. There are numerous small lymphatics.

51. **Nerves.**—The nerves supplying the uterus are from the ganglionic and cerebro-spinal system. The latter comes from the sacral plexus, and the former from the hypogastric and renal plexuses. M. Bouillaud and others deny that the womb receives any from the cerebro-spinal system; but we believe that it does. It is governed by the ganglionic system; but emotion undoubtedly affects it through the cerebral system. Jobert held that the vaginal portion of the cervix, in particular, was exempt from cerebro-spinal relationship—that it was insensible, in fact; but this will not hold water. Experience, Müller, Lee, and Frankenhäuser contradict this with irresistible emphasis and demonstration. The nerves have been seen; and then how often have we found the part the seat of excruciating pain.

Do the Nerves enlarge during Pregnancy?—This is a disputed point. Dr. Robert Lee, who is entitled to great praise for his labors in this department, as well as in many other walks in obstetrics, holds, with Tiedemann, that they enlarge and multiply; that the nerves become hypertrophied. Dr. Snow Beck said that this was not the case, and he was rewarded with a gold medal for his paper. It is probable that the chief thickening is in the neurilemma, though we have no doubt that some hypertrophy obtains in respect of the nerve substance. Frankenhäuser has written an admirable monograph on these nerves, illustrating the subject with some finely-executed plates (Die Nerven der Gebärmutter und ihre Endigung in den glatten Muskelfasern, Jena, 1867). In this splendid monograph he has traced the nerves through the cervical ganglia of Lee; the great uterine plexus, and ovarian nerves, into the very core of the muscular fibre. The student who wishes to get thoroughly acquainted with this subject should read Frankenhäuser, Tiedemann, Lee, Snow Beck, Robin, and Hirchfield.

52. **Fallopian Tubes.**—These are from 4 to 5 in. long. Direction: upward and outward, then downward, backward, and inward. They can be felt like a bit of cord in the broad ligament, especially that part towards the uterus. The canal of the tubes is very small throughout, and smaller towards the uterine end. It will admit a fine stilette. The tubes terminate in a fringed extremity, like the tentacles of a polyp; it is the fimbriæ, or morsus diaboli. This part is applied to the ovary during impregnation. It is common to find one of the fringes attached to the ovary, but the bulk of the fimbriæ, together with the opening of the tube, which is larger than the uterine aperture, is free.

Structure of the Tubes.—Externally peritoneum. Middle coat is continuous with the middle coat of uterus, but the fibres are better developed. Some of them are arranged longitudinally, others concentric and circular, so as to promote the peristaltic movements of the tubes. There is also a little connective tissue similar to that of the uterus.

Mucous Membrane.—This is also continuous with that of the womb. It is disposed into longitudinal rugæ, which folds favor dilatation. Cylindrical and ciliated epithelium covers it, and let it be noticed that the direction of the movement of the cilia is from the ovaries to the uterus. There are no follicles or villi.

53. **Function of the Fallopian Tubes.**—1. For the transmission of the sperm-cells to the ovary. 2. For the conveyance of the impregnated ovum to the uterus. They are the sperm-ducts and oviducts, and thus play an important part in the female economy. The grasping of an impregnated ovum by means of the fimbriæ is a profoundly interesting and wonderful act. It eclipses the most cunning and dexterous legerdemain.

The tube must be applied to the very spot where there is an impregnated ovulum ready to emerge, otherwise we should have extra-uterine pregnancy. That it is so applied almost unerringly betrays some wondrous influence existing between the ovum and the fringe grasping it, or some finely-balanced or adapted reflex mechanism. The embracing of the ovaries by the tubes is partly favored by their congestion, a condition common to them under sexual excitement.

54. **Ovaries.**—The ovaries are the analogues of the testes in the male, and were called by the older writers testicles. "Women," says an old author, "have two testicles as well as men." They are flattened bodies, oval-shaped, and about the size of a large almond. They are placed behind the Fallopian tubes, in the posterior fold of the broad ligament, dangling loosely in the pelvis, and about 1½ in. from the edge of the uterus. They are attached by the round ligament to the uterus. *Structure.*—Schröne has done much to clear up the structure of these bodies. Tbe old view was that they were invested by peritoneum, but Waldayer has shown lately that this is not the case. By treating an ovary attached to the broad ligament with a solution of nitrate of silver, the ovary uncovered by serous membrane is made of a darker hue than the latter. The cells of the ovarian membrane, too, are different from those of the serous membrane. Beneath the investing membrane is the tunica albuginea. The stroma is of a pale red or reddish-white color, and consists of fibrous tissue similar to that of the uterus. The most important part is the Graafian vesicles, or mucous follicles. These exist throughout the stroma of the ovary, but are more numerous toward its external surface. With the naked eye only from 12 to 20 may be observed. With a microscope they multiply almost indefinitely, just as, under a telescope, do the stars in the blue concave above. The old view that they were deeply placed is incorrect. There is one matured every month independent of impregnation—that is, in one ovary, not one in each. The minute structure of these is given when speaking of ovulation. The blood-supply comes from the spermatic and uterine arteries. The nerves are from the renal and spermatic plexus; the lymphatics are not numerous.

55. **Ovulation.**—The Graafian vesicle, which is about the size of a small pea, is just an ovisac. It is seen in the ovary soon after birth—at first small, but increasing in size up to the period of puberty. From this time, on to the climacteric period of the "change of life," or final cessation of the catamenia, a series of Graafian follicles get matured, approach the surface of the organ, rupture, and discharge their contents, chiefly at a menstrual period. *Structure.*—They were described by Fallopius and Vesalius, but more particularly by De Graaf, whose name is thus associated with them as Hunter's is with retroversion, or Simpson's with chloroform, or Ould's and Naegelé's with the mechanism of labor. But there were men who did more, and went deeper than De Graaf. Von Baer discovered the ovule, Purkinje the germinal vesicle, and Rudolph Wagner (of Göttingen) the germinal spot. The follicle has two layers, one internal and fibro-cellular, the other external and vascular, and composed of the true structure of the ovary. Within the ovisac—(1.) A yellowish, albuminous, granular mass, the tunica granulosa, or epithelial lining of the ovisac. Around the ovule these granules are gathered in a disc-like form—discus proligerus.

(2.) *The Ovule itself.*—This is about 1-200th of an inch in diameter; has an external membrane, called zona pellucida, or vitellary membrane, or membrane covering the vitellus or yolk. Within it is the germinal vesicle. This germinal vesicle is about 1-60th of a line in diameter. Lastly, within this vesicle is the germinal spot. An ovule then, it need not be forgot, is just yolk and its covering, germinal vesicle, and germinal spot.

56. **Rupture of Graafian Follicle.**—When the Graafian follicle is about to shed the ovule, it approaches to, and projects above, the surface of the ovary. The bursting is thus effected. The granular fluid—liquor folliculi—which is secreted by the epithelial lining of the ovisac, increases, and distends the follicle until its coats, including that derived from the ovary, are attenuated and give way. The granular fluid, as the follicle bursts, squirts out the very minute ovum, or ovule rather, into the Fallopian tube, which is ready, nay, greedy, as it were, to receive it; and which tube applies to it a rarely erring grasp. So minute is the ovule that, without this fluid, it could not be properly grasped for expulsion. Another beautiful arrangement is this, that tags of the proligerous disc are thrown out, and restrain the ovule, helping to direct it into the proper channel. Various theories have been broached as to how the tube applies itself to the ovary. Rouget says it is by the combined contraction of what he terms the ovarian-tubal muscular fasciculi. It is a reflex act, the distension of the muscular fibres of the ovary, which follows the maturation of the Graafian vesicle, exciting it.

57. **Formation of the Ovules.**—As regards the formation of these, Dr. Martin Barry believed that they were formed from the numerous nuclei existing in the stroma of the ovary; and this is probably the correct view. It is held that the germinal vesicles and their nuclei are coeval with the formation of the ovary, and that the follicles grow or develop around them, for the purpose of aiding their maturation; and also to form the machinery for the expulsion of the ovule at the culmination of its development—that is, when it is fit for impregnation. There is another theory—viz., that the ovules are developed from the acini separated from the substance of the ovarian parenchyma (Huschke). New epithelium and new germinal substance are continually being developed during the period of reproductive power.

It may be added that, as a rule, an ovule escapes about the end of a menstrual flow, or shortly thereafter. Immature ones have been found to escape even before puberty. The period an ovule requires to travel through the Fallopian tube and uterus is not precisely known.

58. **Corpus Luteum.**—Besides the Graafian vesicles, we find in the ovary of a woman, more especially if she has been pregnant recently, a little mass of matter the size of a pea, of a yellowish-red color, and which Malpighi termed corpus luteum (De Graaf called it corpus glandulosum). It contains a central cavity, which is sometimes filled with coagula, at other times empty. It is formed thus: At the period of the bursting of the vesicle, before spoken of, the membranes of the ovisac become congested. Blood is effused into its cavity, and, as Pouchet observed, the membrana granulosa, or epithelial lining of the ovisac, becomes developed in a peculiar manner. It gets thickened by the formation of new cells, at first of a reddish, then of a yellow color. The yellow matter is arranged in folds, which stretched from the cavity toward the circumference of the ovisac. Gradually, by increased development and the contraction of the ovisac, its internal surfaces unite, and it becomes of a stellate form. Before this change has occurred, the effused blood has become decolorized, liquefied, and in part absorbed. The substance of this little body is, as Hunter said, "tender and friable," soft and

fleshy. Numerous vessels run through it from the external surface of the ovisac, and it may be ejected from the vessels of the ovary. Much discrepancy has existed in reference to the formation of the yellow layer. Wharton Jones and Dr. Lee held that it was a deposit external to the lining membrane; Müller and Dalton maintain that it is a hypertrophy of the outer membrane; while Kölliker says it is formed partly by hypertrophy of the epithelial lining, and partly of the internal or fibro-cellular layer of the ovisac. On the surface of the ovary, just over the site of the corpus luteum, is a raised cicatrix, showing the part through which the ovule escaped. It is difficult to tell the date from conception at which the central cavity of the corpus closes and disappears. It has been found in the sixth month of pregnancy, and it may generally be discovered to the end of the fourth month. It has occasionally been found after delivery. It is also difficult to say when it disappears from the ovary altogether, for in rare cases it has even been noticed five months after labor. It is not a permanent thing, however, like the scars of wounds; and the opinion is erroneous that we can read the number of children a woman has carried from the number of corpora lutea existing in the ovary.

59. **False Corpus Luteum.**—It was an aphorism of Haller's, and a true one, that conception always involved or produced a corpus luteum. It is not true, on the other hand, that, as alleged by the same authority, a corpus luteum is the offspring of impregnation only, and is never found in the virgin. Dr. M. Duncan says, that even in pregnancy a corpus luteum may be absent. There is, however, a difference in the aspect and characters of the two, and it is important, especially medico-legally, to know this.

Difference between False and True Corpus.—When an ovule escapes from the Graafian vesicle of a virgin ovary, we have changes somewhat similar to those occurring in the true. The membranous layer, however, is more limited, and instead of being yellow, is of a dull-red color. It reaches its greatest development about three or four weeks after the escape of the ovule, and then disappears, leaving only a small cicatrix. In the case of the virgin, too, other Graafian follicles are being matured in the ovary, while as regards the true, the occurrence of impregnation arrests the development of the ovules. The false corpus has no vessels, and cannot, therefore, be injected. Again, several are found in both ovaries at the same time. Lastly, there is no regular central cavity, nor the stelliform white lines.

CHAPTER IV.

MENSTRUATION.

60. The menstrual flow, menses, or catamenia, consists of a sanguineous discharge from the uterus every month. When the flow occurs regularly, a female is said to be "regular, herself, all right, poorly, unwell, having her courses, her period," etc. When not regular, or when she has not menstruated at the proper time, the expressions used are, "nothing has been seen, the courses are not right, she is not herself, she

has never been unwell," etc. And here let us say, in passing, that the young physician, when he has occasion to question a female in reference to her menses, should do so in the gentlest and gravest manner possible. He would not be rough to a queen; let him not be so to a pauper. The menstrual flow is a discharge that may be considered peculiar to the human female. A particular species of monkey is said to menstruate; but the discharge probably resembles that from the vagina during the time of heat in the mare, cow, bitch, and female elephant, and due to the engorgement of that canal.

61. Some have denied (Roussel, etc.) that menstruation was an original function even in the female; they maintained that it was a result of her social condition, and not depending on her organization. It was said that man in a state of society fed over much—gluttonized, in fact, and thus became plethoric. The menstrual flow was, therefore, a drain, a safety-valve, an outlet for redundant blood. If it did not appear, one thing was clear—the female would burst like a high-pressure boiler. If this theory had been correct, what ought to have followed? Why, man also should have menstruated. Hemorrhage should have attacked him periodically; for surely good feeding is not solely confined to the softer sex. Galen held that the flow was due to a plethora, but he differed from Roussel, who alleged that the congestion was artificially produced. Facts also are against the doctrine of its being an acquired habit, a redundancy springing from the mode of living. Moses stated it to have existed among the women of his period; and among the savage tribes who live in a primitive and simple manner, it has been found to exist. Besides, if it depended on the feeding, why should it be delayed just until the time when the female is approaching womanhood?

62. **Period of Occurrence.**—The time of its appearance marks that of puberty. "They are then looked upon as women," says Dionis; and now the female is capable of conception. In this country, and in temperate latitudes, the menses appear about the ages of 14 or 15 years. In tropical countries—Hindostan, for example—it is one or two years earlier; while in cold climates, such as Labrador, it is a year or two later in making its appearance. There is thus a difference of from three to four years between the natives of the tropical and arctic regions. There have been occasional instances where the function has begun much earlier; for instance, at 9 months, at 19 months, at 3 years. Mr. Whitmore gives a case where it occurred at the extremely early age of 5 days. Another case of *menstruatio præcox* is reported by Dr. Ashton in the *Lancet* for March 11, 1871. The discharge began at the early age of 2 weeks. It was of red color, and continued. Nothing abnormal was detected about the genital organs. In all these cases the discharge was persistent at regular periods, and not desultory or ephemeral.

63. Mode of living, though not the cause of the discharge, probably affects the period of its appearance in a slight degree. Among the higher classes it appears a little earlier than among those of humble life. Raciborski holds that race, apart altogether from climate, influences the time of the appearance of the discharge. For instance, if an Indian child is brought to England, she will still menstruate at the earlier period common to the tropics; while, on the other hand, an English girl in India will have her catamenia at the same time that she would have had it at home. Jewish females also menstruate in high latitudes earlier than the native women.

The period at which the discharge ceases, which is termed the "*change* *of life*," or turn of life, ranges from 44 to 50 years. If it began unusually early, it might terminate a little earlier, and *vice versa*. It has been deemed a time of considerable danger to the female, but, according to the researches of various distinguished men, women are not liable to greater mortality at this time of life than men. Thirty years is thus about the longest period during which this flow is maintained. During lactation and pregnancy the discharge usually ceases, although instances happen where it does not. Dr. Sumpter (*Lancet*, August 31, 1867) reports an instance of a female at Cley-next-to-the-Sea, who was menstruating regularly at her 77th year. She was a married woman, but never was pregnant.

64. **Recurrence of the Menses.**—The flow occurs every month, as its name (menses, catamenia) signifies, or every 28 days, deducting 4 days or so for the period of its continuance, which is the ordinary term. This catamenial month, therefore, does not correspond either to a solar month, which is nearly 30½ days, nor to a lunar month—that is, the time between one new moon and another—which is 29½ days. The length or brevity of its continuance, of course, affects the period of the interval. If a woman is "unwell" for a week, then the interval is shorter; if for 3 days, then it is longer. In many the period is very precise, unerring, and regular, the same day of the week marking the appearance of the discharge. In others it is less regular, and very capricious—appearing in some every 2 weeks, or 3, or even every 6. There is a tendency in nature to abide by some multiple.

65. **Character and Quantity of the Discharge.**—About 4 to 8 ounces escape at each period, and in a gradual manner—in fact, just a gentle oozing. The secretion is of a dark-red color, like venous blood. It has a peculiar odor, which you may recognize on entering the apartment. The fluid consists chiefly of blood, with an admixture of mucus and epithelium from the uterus and vagina. Donné, Hassal, Franz, Simon, Rindskopf, and others have examined it chemically and microscopically, and found it to consist of the foregoing, with granular matter from the uterus and vagina. The discharge is alkaline as it escapes from the os uteri, but becomes acid from mixing with the vaginal secretion. It is this acid, and not, as before imagined, the absence of fibrine, which averts its coagulation. We sometimes, however, find it coagulated, and clots coming away, attended with some difficulty and pain. In such cases the acid must be deficient, or the discharge so profuse as to neutralize it, or, owing to narrowness or stricture of the os, the blood gets pent up *in utero*, and loses its fluid character there.

66. The nature of this discharge was much misrepresented in former and less enlightened times. Some ludicrous opinions were current. By some authors it was deemed bland and simple; by others as very deleterious, and even of evil and malignant character. The ancients attributed to it the most virulent influence, both on animate and inanimate creation. Pliny alleged that the approach of a menstruating woman would turn new wine sour, render fruitful trees barren—nay, even destroy their vitality. Were she to sit near a pleasant and fruitful garden, it would be transformed into a withered waste. To tread on a verdant meadow would change it into a "black and blasted heath." On the other hand, Fallopius deemed it innocuous; and, coming further down, La Motte, though not sharing Pliny's foolish fears, had a certain grudge against it. He relates with naïveté the following story: "I see," says he, "sufficient to make me apprehend the presence of woman in this

situation (or condition), especially if she have red hair. I had a servant of this kind. One day I gave a breakfast to a number of my friends. White wine is the kind usually preferred on those occasions, especially if you intend to eat oysters, and mine was excellent, and was drawn by this servant. My friends expatiated on the goodness of the wine. The next day I breakfasted in like manner with one of the friends who had been with me, but he had no wine but red. I immediately sent for some of my white wine, but it was found so spoiled and sour that it was fit for nothing but vinegar." The red-haired menstruating domestic, in short, had turned the delicious sweet wine into vinegar. "The same maid aided in salting some pork, which was likewise found to be spoiled, though the part that was salted in another cellar by another person was perfectly good." These notions were no doubt the offspring of the opinion that the discharge was a means of relieving the system of the woman from peccant and noxious humors supposed to be generated within her.

The more respectable females generally wear a bandage to absorb the discharge, although many less careful women move about without this precaution, and leave a sanguineous imprint wherever they go and tarry. The ancients forbade the use of a bandage, thinking that it would retard, or arrest even, the outflow of that fluid which they deemed of so baleful a character. In this climate, at least, there would be more risk of an injurious arrestment of the discharge by going without than with a napkin.

67. **Symptoms.**—The symptoms which accompany menstruation differ in different individuals. Some are but little put about, others suffer a good deal. In connection with the first menstruation, there is often much lassitude, pain in the back and head, aching down the thighs, feverishness, depression of spirits, dark aspect under the eye. Occasionally there is pain in the thyroid gland. Other symptoms are sympathetic pains in the mammæ, pallor of countenance, debility, ringing of the ears, palpitation, sense of suffocation, starting from slight causes, convulsive twitchings, and even chorea, changeful and capricious appetite. The most marked symptoms are witnessed generally in those young ladies who are brought up in a delicate, refined, and luxurious manner. As a rule, when the discharge appears, the more marked symptoms are moderated, or pass away altogether. Some females, however, suffer extremely every successive period.

68. **Moral and Physical Influences and Results.**—Interesting phenomena, moral and physical, are now manifested. The body becomes more rounded; the pelvis expands; the neck and throat bulge more, and become more symmetrical; the mammæ enlarge, the nipples protrude; and the whole chest especially expands. The voice also changes in a marked manner. The girl becomes more dignified and womanly; the eyes sparkle with increased intelligence, and puerile concerns are discarded for graver interests.

69. **Treatment.**—If the advent of menstruation is attended with a good deal of distress, some little treatment may be required—rest, warmth, and some soothing medicine, such as Potassii Bromidum. If it should fail to appear at the anticipated and proper time, should any attempt be made to force it, as it were? Not a great deal should be done in this way. Aid the process by a sitz-bath, or by a light chalybeate. I am fond of the Tinct. Per-chloride and the Per-nitrate Liq., and, where the stomach is weak, the Ammonio-citrate. An aperient is often useful, too,

as acting by contiguous sympathy. The aloes and iron pill has long been a favorite in North Britain, and it has often proved very serviceable. We think it a mistake to associate the iron with the aloes, and have stated our reasons at length when treating of Amenorrhœa, in which chapter the treatment of *emansio mensium* is given at greater length. You will be often consulted in regard to its non-appearance; try mild measures to begin with, such as those above-named. Many will come to you lamenting its cessation, much to their vexation, the cause being that they have done something worthy of condemnation. You can generally extract the true cause of the suspension from the most tortuous, evasive, and close-fisted woman; and take care, when you more than suspect that there has been illicit work, that you do nothing, or even prescribe anything, that may compromise the life of the contained living body, not to say the existence of its perturbed parent. Were you to be so far lost, much moral damage would be inflicted also on yourself.

70. **Source of the Menstrual Secretion.**—The source of the menses is an important question. The discharge has been fathered on diverse of the generative organs; the vagina, the os and cervix, the cavity and body of the uterus, the Fallopian tubes and the ovaries. The true source is now believed to be the cavity of the body of the uterus. In cases of prolapse, and, better still, in cases of inversion of the womb, we have positive evidence of this, for the blood is seen flowing from its surface. Post-mortem examinations have been made of women who have died during menstruation, and the following appearances have been found: Uterus congested; its vessels gorged with blood; mucous membrane swollen between the body and cervix. In other cases, and perhaps this is most general and common, the mucous membrane is shed. Drs. Tyler Smith and Handfield Jones found it so; they discovered no traces of the epithelium or utricular glands. The sub-mucous surface was a pulpy mass, in which were found ends of vessels, broken tubes, epithelium, blood globules, and mucous corpuscles. Pouchet supposes that a decidual membrane is formed every period, and discharged in the form of an albuminous plug, 10 or 12 days after the flow ceases. Kölliker says that the lining membrane is thickened; that the blood escapes from the ruptured superficial capillaries, and the epithelium of the cavity of the body is, for the most part, thrown off; but he deems it an abnormality for the whole to be cast off. Müller compares the change to moulting, a new epithelium being produced. There is no doubt, then, that there is a good deal of breaking up of mucous membrane during menstruation, and discharge of the debris; it is in fact, exfoliated every month. A new one is, of course, formed. In the os and cervix the mucous membrane is not disintegrated, but remains entire. The view that was held by many, that the catamenia was exudation merely, was exploded after the nature of the discharge was settled by the chemical physiologists. Blood cannot escape exosmotically; there must be rupture of vessels.

71. **Condition of the Ovaries During Menstruation.**—Menstruation is not so much to be viewed as the escape of blood from the uterus, as ovular maturation. One or more ovules ripen every month; these excite ovarian congestion; and, in turn, and from sympathy, the Fallopian tubes and uterus become congested also. We may have menstruation, then, without menstruation in the usual acceptation of the term (a paradox seemingly); that is, there may be no sanguineous outflow as a con-

sequence of the monthly ripening of the ovules. This explains how women may become gravid, although no "colored discharge" has been seen. It is thoroughly recognized now that the ovaries are indispensable to, and the mainspring of, the menstrual flow. Ovarian excitement, the offspring of the maturity of the ovule, is, in fact, the cause of menstruation. The power of the ovaries, in this way, is seen in cases where they are diseased, or atrophied, or wanting. In the former case, the regularity and quantity of the discharge has been interfered with; and in the latter, that is, where they were wanting congenitally, or as a result of operative interference, menstruation ceased altogether. This happened in Pott's case, at St. Bartholomew's Hospital. On the other hand, when the ovaries have been present, and the uterus absent, the menstrual molimen has existed. Pain in the back occurs, and there may be a flow of blood from the vulva, or an epistaxis or hemorrhage from some other part of the body. Permanent amenorrhœa, therefore, is a result of the removal of these organs. The menstrual period is one characterized, as a rule, by the discharge of a mature ovule; but Müller says that it is not a law that one is discharged every period. It very frequently happens, however; and no doubt the generative system of the female is subject to the almost universal law of the periodical discharge of ova, independent of coition.

72. **Final Cause of Menstruation.**—The object and purpose of this function is still a matter of speculation. Some allege—1. That it is to get rid of the redundant blood employed during pregnancy in the nutrition of the fœtus; and, 2. That it is to prepare the uterus for impregnation and conception. Sexual desire manifests itself in the human female with more force at this period, and in the females of the mammiferæ at no other time. If the union of the sexes occurs, the ovule is fecundated by the direct action of the semen upon it. If no union takes place, it is extruded notwithstanding, and enters the Fallopian tubes, but there perishes. There are some objections to this view. 1. Conception could hardly occur prior to the appearance of the menses, and yet this often happens. 2. It could scarcely happen without their reappearance, or that of the molimen; and yet we find it doing so. Then, again, it would imply the discharge of the ovule about the end of the menstrual flow, in order to prevent it from escaping, or being carried away with it. And, lastly, that conception must take place within a few days of that period, or else the ovule would also escape. Now, impregnation has occurred ten, fifteen, and even twenty days after the termination of the menstrual period. Among the Jews, connection was forbidden within seven days after the catamenia, or five days before it, yet Jewish females conceive like their neighbors.

73. **Is Menstruation Necessary to Conception?**—This question is difficult to answer, but it may be safely affirmed that menstruation is not always an evidence of fertility. As a rule, however, women who menstruate regularly conceive, and those who are irregular and abnormal in this respect are barren. On the other hand, again, impregnation has occurred prior to the first appearance of this discharge, and also after its final cessation—"the change of life." Be it observed, however, that in these cases there may have been a serous flow instead—a vicarious secretion unobserved. Anyhow, as was previously touched on, there must have been that ovular maturation which is just equivalent almost to menstruation. Further, if menstruation—that is, the appearance of the colored discharge—does not take place, it seems to imply an imperfect

condition either of the uterus (the home of the embryo), or of the ovaries; in either of which cases we can hardly look for impregnation. If the ovary supplies a mature and perfect ovule, it may be fecundated apart from and without the catamenia, but then it may perish and be cast off for want of those changes, and that support, which are the property of a healthy uterus only. That the ovule be sustained and nourished, it is necessary that the decidua be formed; but can a non-menstruating uterus develop the membrane? Most probably not. The capacity for menstruating, then, is probably necessary to impregnation, although the capacity may exist without the discharge. This would account for those cases which we often find occurring in females during lactation, where they become pregnant "before they have seen anything." I have met with not a few such, where the woman, between one pregnancy and another, has had at least no colored discharge, or "show," as they sometimes term it. The instances are very rare where conception takes place before a first catamenia, and after the last, or final change. The latter is deemed an extraordinary occurrence, and is an illustration of what we sometimes see, where Nature renews an obsolete and disused function, repairs a degenerate part, or restores a lapsed sense; such, for example, as the development of teeth in enfeebled senility, and the renewal of the senses of vision and hearing which had long been suspended.

74. **Fitness for Fecundation—Most Likely Time, etc.**—In the human female, as well as among various of the lower animals, there is doubtless a period when the liability to become impregnated is greater than at other times. This is, in all likelihood, just when the ovule is thoroughly mature, and bursts from its prison-house. This deciduous time is synchronous with the catamenia; hence the period of the menses is that of greatest aptitude for fecundation. Just before the menstrual flow, then, is the time for consummating a fruitful congress. In cases of apparent barrenness, connection may be suggested at this particular time; for undoubtedly there is a tendency among many to eschew the "monthly period." History records that Henry II., of France, despairing of issue, was recommended to cohabit at that time with the Queen (Catherine de Medici), and that by doing so he achieved an heir to the crown.

CHAPTER V.

GENERATION, CONCEPTION, ETC.

75. **Generation, Conception, Development of Ovum.**—The fruitful period lasts about thirty years in the human female—that is, it traverses and embraces the three decades of menstrual or ovular capacity, beginning and ending with it. Nearly half a lifetime, then, does the capability of generation, conception, or fecundation exist. The process is one of profound interest, as much from its occult nature as from its great results; and it has given rise to many and varied theories—shaky, doubtful, plausible, and absurd. Dr. Allen Thompson, of Glasgow, the distinguished anatomist and physiologist, states them as follows: The theory of the Ovists; the Spermatists; or that of combination, evolution, or epigenesis.

According to the ovists, the mother yields all the material necessary for the formation of the child; the male only arousing the formative powers hibernating, sleeping, lying dormant in the ovule. This view was held by Pythagoras, and also by Aristotle in a modified form.

76. The second theory, or that of the spermatists, of which Galen was a disciple, was this—that the semen of the male alone yielded all the essential parts of the fœtus, the female only furnishing a fit bed for its nourishment and growth. Then the spermatozoa ("seminal animalcules")—these very minute mobile particles—were regarded as miniature men, and were called homunculi; and some authors imagined that all the different parts of the body existed already formed in them. Others held that these were of different sexes—that they copulated, and begat male and female.

The third view, that of syngenesis, or combination, is this, that male and female both yield at the same time some product—semen, it may be; that these combine and form an ovum or egg from which the fœtus is formed.

Another view related to this theory is that of metamorphosis. Here a formative material is supposed to exist, but is said to alter its form so as to be transformed into the new existence.

Lastly, Buffon's opinion was, that organic molecules or germs exist in plants and animals alike; that these possess productive powers, and that a certain number are used in the construction of the textures of organized bodies; and that, in the process of generation, the redundant quantity of them proceed to the sexual organs, and there constitute again the rudiments of the offspring. Such are a few of the more prominent theories held; many more have been promulgated; but it were a waste of space and time to reproduce them.

77. We shall rather now give the more recent facts in connection with the subject. We have alluded to the existence of the ova in the ovaries. Well, these undergo, after fecundation, very marked changes. Some hold that the germinal vesicle disappears; others, that it undergoes a wondrous transformation. Martin Barry maintains that it does not disappear, but that it returns again to the centre of the ovule, where it becomes altered by a process of cell-development, which ends in the production of two cells in the centre of the yolk, from which cells the embryo is afterward developed. The germinal vesicle must be viewed as a parent-cell; its nuclear particles, which form the germinal spot, are developed into secondary cells; these again are formed into tertiary cells; and so on until the vesicle has got subdivided into a mass, which leads to the rupture of the parent-cell. From some of these cells it is believed that a larger cell, the future embryo-cell, occupying the site of the *macula* germinativa, and constituting the true germinal point of the future being, is formed. It is not yet settled whether the embryo-cell, which replaces the germinal vesicle, is formed just before or after the act of fecundation.

Male Contribution.—The semen secreted by the testes is thrown into the vagina in the act of coition. The essential part of this secretion is the spermatozoa.

78. **The Sperm Cell.**—The spermatozoa, or peculiar particles (not animalcules, as was at one time thought), are developed within the seminal cells found in the secretion of the testes. Within these cells they are arranged in bundles; but in the passage of the fluid from the gland through the efferent apparatus the cells burst, and the spermatic particles

are set free. The spermatozoa consist of a flattened body and a tail. The width of the body is about 1-6000th part of an inch, and the length of the spermatozoon is about 1-400th to 1-600th of an inch. Kölliker views them as ciliated cells, and believes that they move about in the fluid semen, as well as along the mucous membrane of the vagina and uterus, by a succession of wavy movements. It is the spermatic particles, and not the seminal liquor, which are the fecundating power. This has been proved by experiment—by filtering the semen, and using both separately in the fecundation of amphibia. These spermatozoa move principally by means of the undulations of their tail. M. Godard has discovered some with a very small head, and this kind is characterized by much swifter movements than others. Donné has pointed out that locomotive power is destroyed in some morbid conditions of the vaginal and uterine secretions, and in consequence the fertilizing power of the spermatozoon is destroyed. If it loses power of motion, there is an end of fecundation. If it be the case that the depraved secretions of the uterus thus injure the spermatic particles, this may account for some cases of sterility where there is nothing abnormal in connection with the ovary.

79. Spallanzani and others have demonstrated that very little semen is necessary. The spermatozoa within the sperm-cell correspond with the nuclear particles forming the *macula* germinativa, or germinal spot of the germ-cell. The true origin of the ovum, then, as distinct from the ovule, is in the alliance of the germ-cells and sperm-cells furnished by both sexes.

Act of Fecundation.—How do these cells unite? Dumas and Prevost were of opinion that the spermatozoa pierced the ovule, and became changed into parts of the animal embryo. Dr. Martin Barry demonstrated the fact of the penetration of the ovule, and numerous other observers, such as Keber, Bischoff, and Meissner, have verified the same fact. After penetration they come into contact, and unite with the contents of the germ-cell. More than one spermatozoon is necessary, and the greater the number penetrating, the more likely is fecundation to take place. Within the ovule the spermatic particles become still—they cease their wavy mobility, break down, and disappear. By this time, however, they have effected their purpose, accomplished their great and interesting work, exerted their fertilizing influence, inaugurated the formation of a future being.

80. **Place of Union between the Germ and Sperm-Cells.**—Some difference of opinion exists as to the locality of meeting or junction of these cells. The old authors held it was the womb. At the present day the theory most generally held is, that union (and vivification) is consummated in the ovary. Bischoff, Wagner, Barry, Coste, and others, have detected spermatozoa in the ovary of animals that had been killed soon after connection. Bischoff found them in the ovary of a bitch twenty-four hours after copulation, and still endowed with active motion; and in a female mammal, a day or two after connection, he has seen them in the oviducts, and on the surface of the ovary. The spermatic particle, then, is gallant (if we may be allowed a little pleasantry); it requires not its bride to come half way to meet it, but ascends and travels its zig-zag journey, on to the secret bower where resides the lady-love with whom it is to unite. The seat of contact is not then hypothetical, but a demonstrated fact. We should mention here, also, that this has been proved by experiments. Nuck and Haighton placed a ligature,

soon after copulation, around the oviduct of a rabbit, thus occluding it, and shutting it off from the uterus. On killing the animal afterward, it was found that the development of the ovum was proceeding. There is a theory (Coste) that points to the necessity of the ovary being the place of union; for it is said that the ovule, soon after leaving the Graafian vesicle, deteriorates, and loses its capacity of being fecundated. But although union of the cells in the ovary has been proved, there are those who yet deny that vivification is there accomplished. Pouchet is one of them, and he argues in this way: He says that the ovary cannot be the place, on the ground of the peristaltic movement of the Fallopian tubes being toward the uterus, and not toward the ovaries. This is but a feeble argument, for the spermatozoa, as already seen, are endowed with the power of locomotion, and need not the aid of this peristaltic movement, but are independent of it. Besides, the direction of the movement of the oviduct is easily accounted for, as it has to bear the ovule to that home—the uterus—where it resides until the fœtus is perfected. It may be granted that occasionally union is effected further down, either in the oviduct or the uterus itself.

81. **Development of the Ovum.**—After fecundation great changes take place in the ovule; it is formed into the ovum. The first thing observed is the cleavage of the yolk, and the division of the cells. The embryo cell elongates, and then divides into two by spontaneous fissure (Swammer-dam). At the same time, the yolk divides into two portions, in the centre of each of which is found one of these embryo cells. The two cells again divide, and subdivide, first into four, and then into eight, and so on, yolk and cell combining together to form a mass called "the germ mass." The yolk undoubtedly forms the material for enabling the cells to multiply. It is from this germ mass that the entire structure of the being is formed. The cells which lie nearest the surface, and immediately under the zona pellucida, become grouped together, and form the germinal membrane or blastoderm. This membrane then divides, in the first instance, into two layers—the external or serous, and the internal or mucous. Afterward, other cells of this mulberry or germ mass gather between the mucous and the serous layers, forming a third layer, termed the vascular. In the last layer, viz., the vascular, the heart and vascular system grow and develop. The mucous layer gives origin to the mucous membranes and glands; and out of the serous one are formed the brain and spinal marrow, the extremities, and other parts of the skeleton. Such is a brief outline of the changes effected in the ovule after fecundation. To enter more minutely into the matter would be inconsistent with the scope and purpose of this short work.

CHAPTER VI.

PREGNANCY, OR UTERO-GESTATION.

82. **Pregnancy, etc.**—The period of pregnancy is that space of time which extends from fecundation to parturition. It is a period of surpassing interest, not only to the woman but (owing to its bearing on the economy, and the great changes which it effects in various organs) to the

physician. These changes are not to be viewed as morbid, but simply as natural processes adapted to the attainment of a great end. It is true that some females suffer much physical distress during this period ; but it is no less true that many others not only do not suffer, but are blessed with an increased measure of health and strength. In the first case there were probably weaknesses, or morbid conditions, latent or patent, existing before pregnancy, and these have become aggravated by it. It is a period of constitutional excitement, the neurotic and vascular system participating much; and while in delicate and disordered females (some of them, at least) there is, owing to this, an augmentation of distress, in others, of a healthier type, there is an advent of fresh liveliness and vigor. Nay, in some sickly women (phthisical, for instance), this state, far from being pathological, is the reverse : it combats the morbid elements, and robs them, for a time, at least, of their destructive power. Women fast verging to "the everlasting bourne whence there is no return" have, in this way, their mundane existence prolonged for years. Under normal conditions, then (but, alas! at this time of day how rare is the normal), the period of utero-gestation is not an abnormal one ; and this is a benignant arrangement, for grave and terrible enough are the gravid woman's pangs when the day arrives that she has to bring forth her offspring. It has been said that this period is one of excitment; and, it may be added, that effects are often manifested with electric speed. Immediately after fecundation, females have been conscious of this, and have experienced the most unwonted sensations.

83. **Uterine Changes during Pregnancy.**—When impregnation has taken place, a mysterious impulse is communicated to the womb, and it becomes subject to increased vital action; this, too, be it remembered, before the ovum arrives in its expectant cavity. It becomes congested; there is an afflux of blood to it; its vessels enlarge, and indistinct ones are seen to grow and expand, and convey blood for the first time. The coats of the arteries also become thickened and stronger. The veins become distended, and the lymphatics grow until they become visible. The nerves also increase in size. The parenchyma of the uterus, more particularly, undergoes great change. It enlarges by an increase of the fusiform nucleated fibres. The walls increase in thickness, at least during the first three months, until they are from $\frac{1}{2}$ to $\frac{2}{3}$ of an inch thick. Particularly notice where this increase first begins. It is first in the fundus, next in the body, and lastly in the cervix. Some hold the opinion that it enlarges first where the placenta is placed, and then in other parts as a result of the pressure made on it by the contained ovum. During nearly one half of the period of pregnancy the uterus remains in the cavity of the pelvis. After this, when entering on the 5th month, it ascends, and in the fundus, in those females who are not much loaded anteriorly with adipose tissue, it may be felt above the pubis. About the 5th month it arrives about midway between the pubis and umbilicus. At the beginning of the 7th month it is at the umbilicus; at the end of this month it is midway between the umbilicus and ensiform cartilage, and then it reaches this cartilage itself before the end of the gravid period. About the latter half of the 9th month it rather descends somewhat again, owing to the yielding of the abdominal walls. At this full term it occupies the whole of the anterior part of the abdomen, and may be felt as a tense body. The length of the uterus at this time is from 12 to 14 in.; its breadth about 9 in., and antero-posteriorly also about 9 in.

84. **Changes in the Cervix Uteri.**—The cervix swells and becomes

softer; has a soft and cushiony feel; and the os is somewhat dilatable. Its shape also becomes more circular than transverse. The follicles enlarge, and may be detected by the touch. During the early part of pregnancy, up to about the end of the 3d month, the os descends a little, and is slightly anteverted, or turned forward. As the uterus ascends, there is anteversion of the fundus, and the os is then retroverted, or turned backward. Between the 5th and 6th month, the cervix shortens by the expansion of the womb. At the 6th month it is said to lose about a fourth of its length, and it shortens gradually until it may be said to disappear, or form part of the enlarged cavity of the uterus, at the end of the gravid period. The method and time of shortening has led to dispute. The old opinion was that, after the 5th month, the cervix began gradually to develop, and expand from above downward, and thus contributed to the formation of the uterine cavity. Through the labors of Stolz, Cazeaux, and Matthews Duncan, this opinion is in the way of explosion. The cervix becomes hypertrophied and softened, but it is not developed until the last month of gestation. There is an old memoir by Weitbrecht, "De Utero Muliebri," which shows that he, more than 100 years ago, held this view, deemed a discovery of Stoltz. The shortening of the cervix is not by distension of the uterus, but by approximation of its extremities.

85. **Changes in the Mucous Membrane of the Uterus.**—Striking alterations of the lining membrane take place. It becomes turgid and thickened, and this state marks more especially the tubular glands (2 lines long), and the capillaries occupying the interspaces of these. The villi elongate, and, over and between them, is exuded a layer of pulpy matter, celloid particles, and albuminoid material, the quantity being large. The glands enlarge so much that they can be seen by the unaided eye. This enlargement of the follicles and capillaries, together with the exuded material, are just a transformation of the lining membrane, and it is this which constitutes the decidua vera. This change was described by William Hunter, and hence it is often called the decidua of Hunter. This pulpy material soon acquires consistence, and lines the whole cavity of the womb. It was termed decidua from the fact of its fall or shedding taking place, which it does at the time of labor. If there has been dispute about the cervix, there has been even more about the method of formation of this decidua. Some have held the opinion that the decidua vera was a new formation; this was the opinion of Hunter. On the contrary, such able physiologists as Coste, Sharpey, and E. H. Weber, believe it to be only a hypertrophied condition of the mucous membrane. It contains the same glands and other characteristics, and may be therefore just viewed as a modification of that membrane. This decidua is an opaque membrane of a reddish-gray color, and it is in contact with the whole of the internal surface of the uterus. It is rough and flocculent externally, or where it is in contact with the uterus, smooth on the inner side, or that next the ovum, glistening, in fact, like a serous membrane. It is very vascular, and is supplied with blood from the vessels of the womb. Dr. Montgomery examined it minutely, and thus reports: "On the external surface a great many cup-like eminences, or cotyledons, like little bags, exist. Some of them are closed sacs, others are open at the end next the uterus. Within their cavity a milky fluid was sometimes found." Dr. Montgomery suggests that these cotyledons are reservoirs or storehouses for the nutrient fluids separated from the maternal blood, and destined for the nourishment of the fœtus.

86. **Decidua Reflexa.**—The decidua vera consists of two layers; the other one is termed "reflexa." As opinions differed with respect to the decidua vera, so views conflict in reference to the way in which the decidua reflexa is produced. Goodsir, the lamented anatomist, explained its formation thus: The decidua vera, he held, was the mucous membrane altered by a process of cell-development. The ovum, on entering the uterus, he thought, then became buried in the cellular material going to form the decidua vera, dividing it into two parts. According to this reliable authority, it is formed out of the cellular secretion derived from the decidua vera. Coste's view is this: He says that so soon as the ovum enters the uterus, it becomes partially buried in the soft, pulpy mucous membrane forming the decidua; the precise part of the decidua where the ovum is embedded becoming the seat of increased nutrition, which impels it to develop around the ovum, just as fleshy granulations surround the pea of an issue. The altered mucous membrane increases thus in thickness at the point where the ovum is situated, and develops around it until both extremities meet and unite. There is not much difference here between the views of Coste and Goodsir.

Another view is this: that the ovum, instead of getting embedded in the material of the membrane, pushes the decidua before it. It removes a portion of the membrane from the uterus, and as the ovum develops, the decidua reflexa grows also, until at the end of pregnancy its inner surface is in contact with the inner surface of the decidua vera.

87. **Decidua Serotina.**—This is the part lying between the placenta and the uterus. A part of the ovum is left uncovered by the decidual membrane, but another develops until it joins it. It is, as it were, a patch put upon the opening caused by the entrance of the ovum into the plastic material which forms the decidua. The principal use of the decidua is to afford a *nidus* for the ovum in its earlier stages, and, by means of its glands, to supply needed nourishment prior to the development and organization of the placenta.

Hydro-perione of Breschet.—That part of the cavity of the decidua not occupied by the ovum contains a secretion, of an albuminous nature, exuded from the thickened and altered mucous membrane. This contributes to the nutrition of the early ovum before the placenta is elaborated. Breschet termed it the hydro-perione—fluid of the perione.

88. **Chorion.**—The chorion (*choros*, a band or collection), so called from its shaggy fringe of villous excrescences, is the outer coat or envelope of the ovum, and it is developed before the ovum enters the uterus; for when the latter has reached the womb, it is found to possess both chorion and amnion. It is a shining, transparent, and rather tough membrane, covering the whole of the ovum, with the exception of the placenta, which interposes between it and the uterine wall. It is doubtful whether the chorion is developed before or after fecundation. Wharton Jones, Valentin, and others hold that the ovum, as it passes down the oviduct, becomes covered with an albuminous coating. This adheres to the vitellary membrane or outer covering of the ovule, and constitutes the chorion. This albuminous layer is the analogue of the white of the egg, and yields nutriment to the ovule. Though the chorion is smooth and glistening when first developed, no sooner has it arrived at the uterus (for its nine-months' sojournment) than it assumes a villous appearance. It is then fitly termed "shaggy chorion." These villi, which are processes thrown out by Nature for purposes of absorption, have been variously viewed and designated. Hunter termed them vessels, and Burns, Baillie, and

others also so named them. Goodsir and Montgomery deemed them as analogous to the spongioles of a plant. If so, they absorb nutriment by endosmosis. Breschet, Velpeau, Carus, do not consider them as blood-vessels either. But although at an early period they are neither blood-vessels nor canals for the passage of the same, at a more advanced stage vessels are developed in connection with them,—they convey, in fact, the embryonic vessels. As the ovum grows, these villi undergo a change ; they diminish in size and disappear, except at that part where the placenta is formed. By the end of the 4th month this obliteration has taken place. What becomes of the remaining villi? Are they transformed into placental villi? Not exactly; but they form the internal part of them. They are collected and grouped together to aid in the formation of the placenta. They are the framework on which vessels ramify and travel from the ovum to the uterus. The chorion may be split into two laminæ, especially where it covers the placenta. The outer is the exo-chorion, and the inner the endo-chorion.

89. **The Vesicula Alba.**—Before going to the amnion, the umbilical vesicle may be noticed. It lies in the space between the chorion and amnion. It exists always in the earlier months of utero-gestation, and is connected with the intestinal canal. It is the vitellus on which the embyro is first formed, and it is analogous to the yolk of the egg, but only it is not enclosed within the abdomen of the fœtus at last. In early ova it is pretty large; lies upon and communicates with the intestine. It gradually forms a pervious canal. About the 2d month it shrinks, and ceases to be pervious. It consists of two laminæ, an external vascular, and an internal mucous one. It possesses two vessels, the omphalo-mesenteric artery and vein. It shrinks and collapses to the end of the gravid period. According to Velpeau, it is subservient to the nutrition of the embyro until the cord and umbilical vessels are formed.

90. **Amnion.**—The amnion is a thin and transparent membrane, resembling the chorion a good deal, but of stronger texture. It is made up by the coalescing of the layer of small vesicles formed on the inner surface of the membrane which invests the vitellus, with the mulberry-like structure formed in the centre of the yolk, but passing to its circumference. M. Coste calls it a true epidermis of the blastoderma, and says that it is detached from the external surface of the embryonic spot. This membrane is internal to the chorion, and invests the embryo very closely at an early period. It is continuous with the common integument of the fœtus at the open abdominal parietes. At a later period of pregnancy it is separated from the fœtus by the liquor amnii, which it secretes, and which is the fluid in which the child floats. It finally approaches and unites with the chorion. the tunica media intervening. This tunica media is an extremely delicate, transparent substance, resembling somewhat the arachnoid membrane. It is called by Velpeau, "Corps reticulare;" and he considered it to be the allantois; but this view has not much support. The amnion gives the outer coat to the fœtal face of the placenta, and to the funis umbilicus. The function of the amnion is to afford, along with the chorion, a protection to the ovum, besides, as before observed, to secrete the amniotic fluid. The two membranes form occasionally a tough bag; at other times they are feeble and easily ruptured. When very tough, as we shall notice further on, they retard labor; and when very slender, they also delay it in some cases, by rupturing prematurely, and entailing dry passages, and by not forming the invaluable dilating bag. On rare occasions they have not given way at

all, and the entire ovum has thus been expelled. Occasionally a little fluid exists between the amnion and chorion. This, which happens seldom, is called the *false waters*, the true being within the amnion.

91. **Liquor Amnii.**—This is the name given to the fluid, or "waters," as it is commonly called, in which the fœtus floats. It varies much in quantity, from 1 oz. to a gallon or two. We have seen it gush out and down into the floor like a cataract, making young doctors and old women tremble. Its properties also vary. In some instances it is clear and odorless; in others it is opalescent, brownish, or black; dirty, viscid, and offensive to the olfactories. It contains various salts, such as sod. chlor., calcis. phosph., and some benzoic acid, also, some albumen. Its quantity, as a rule, increases as pregnancy advances, though relatively to the dimensions of the fœtus, it diminishes.

92. **How the Liquor Amnii is Secreted.**—This has been matter of controversy. Some hold that it is a secretion from the fœtus, either urine or perspiration. "Most authors," says Dionis, "take this water to be the urine of the fœtus, because of its saltish taste;" but he properly adds, "that is no sufficient reason, for the tears and other serosities have also the taste of salt, and yet are not urine." He also says, "Did the fœtus make water all the time, more than a bucketful would collect." It was poor logic to conclude it urine because of its saltishness; as well, if it had been sweetish, might they have called it arsenic, or acetate of lead, because both, like sugar, are sweet. No one now views it as a fœtal secretion. It is known to exist before the embryo is visible. It is an exudation from the internal surface of the amnion.

93. **Use of Liquor Amnii.**—Its use, like its origin, has been much controverted. At one time it was supposed to be for the nourishment of the fœtus. Haller, Heister, and Müller held that it passed into the stomach, because hairs had been found in that viscus. Müller, however, says that this mode of nutrition must be of little value, being of quite inadequate amount. Rigby thought it would be sufficient to sustain the fœtus in the very earliest part of pregnancy, from the fact that at this time the fluid contains most nutritious matter. Many arguments may be brought against this view. 1st. It is not required, there being a system of vessels arranged for the purpose of nourishing the fœtus; 2d. It is sometimes so foul, offensive, and even putrid, as to render it totally unfit for such a purpose; 3d. It has been analyzed, and found to contain an insignificant quantity of nutritious matter; 4th. Monstrosities have been developed and born alive without œsophagus or digestive canal.

94. **Real Use of Liquor Amnii.**—Its proper function would seem simply to be to protect the young embryo in the earlier weeks, especially from the pressure of the uterine walls, and to protect the vessels of the placenta and cord at a more advanced period, which otherwise would be in danger of having their circulation arrested by compression. Then it also affords some protection to the contained body from any blows or forces acting on the abdomen, and permits of free movement to the limbs of the fœtus, which might otherwise be restrained in a manner adverse to development. A further and highly important use is this, that during labor it contributes to the formation of a soft bag, which helps materially to dilate the mouth of the uterus. Lastly, when this very serviceable bag is ruptured, the "waters" lubricate the vagina and external parts, softening them as by some process of enchantment, and smoothing the passages for the descent of the child.

95. **Placenta.**—The placenta (Fig. 8) (after-birth, or after-burden) is

the organ through whose medium the fœtus is sustained and nourished. It was called placenta by Fallopius from its shape, resembling, as it does, a cake. It is called after-birth, because in natural cases it comes after the birth. It is a somewhat circular, flat, spongy mass, made up in great part of fœtal vessels. It is pretty large about the termination of pregnancy—about 1 lb. weight; diameter, 7 or 8 in., circumference, 24 in.; thickness, about 1½ in. It is smooth and glistening on its internal surface, from being covered by the chorion and amnion, under which the ramifications of the umbilical vessels may be seen. It has been said by some to possess absorbents, and also nerves (Hunter, Wrisberg, Chaussier, Bauer, etc.); but eminent physiologists allege that this is not the case. Did nerves exist, pain would be felt when the cord is cut, which is not the case. On its maternal, or external, or uterine surface, it is covered by the decid. v. (serotina), while on the internal or fœtal surface, which is, as before said, smooth and shining, it is covered by the chorion and amnion, and, according to Hunter and Baillie, by the decidua chorii. If the decidua serotina is peeled off from the maternal surface, the lobes and lobules are seen, with processes of decidua dipping down between the divisions. Each of the irregularly-shaped lobes of which the placenta consists is formed by the ramifications of one branch of the umbilical arteries and vein after their first division, and the vessels of one lobe have rarely communication with those of another lobe; they anastomose but little with each other.

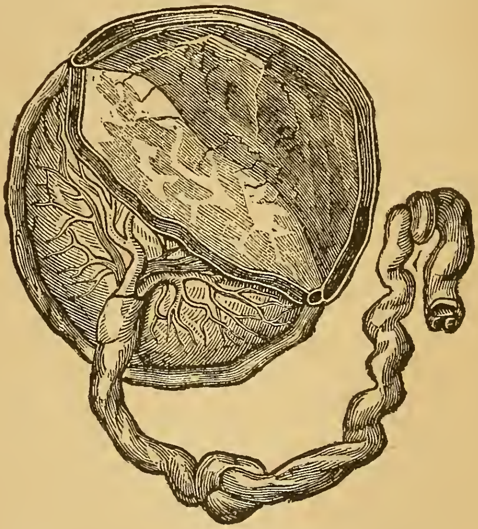

FIG. 8.

96. **Formation of the Placenta.**—The placenta is developed from the villi of the chorion. These villi, as before noticed, diminish and disappear at all points excepting where the chorion is in contact with the uterus. At this point they take on increased development, and vessels derived from the inner layer of the chorion also take on speedy growth. Thus the placenta is formed. The allantois, which arises from the caudal extremity of the fœtus, and conveys the vessels constituting the future umbilical vein and arteries, approaches with seeming instinct to

the same spot where the villi have grouped themselves and are growing, and the cord is generally inserted into the middle of the placental mass. Occasionally the allantois is erratic in its movement, and inserts the umbilical vessels at or near the edge of the placenta. In some rare instances it misses its mark altogether—conveys, in fact, the vessels to the wrong part of the ovum, in which circumstance the latter perishes from lack of nourishment.

97. **Arrangement of the Vessels.**—The two umbilical arteries, at their insertion into the internal or fœtal surface of the placenta, divide and subdivide as they dip into the substance of the cake, and are minutely distributed to the various lobes. There they meet the minute radicles of the umbilical vein, capillaries probably being interposed. These venous radicles gradually coalesce, until larger vessels are formed, which again blend to constitute the umbilical vein.

98. **Utero-Placental Circulation.**—This is a subject that has engaged the careful attention of many great physiologists, including Hunter, Wrisberg, Reid, Goodsir, the Webers, etc. The connection between the maternal and fœtal blood, the relation between the uterine and fœtal system of vessels, has been the ground of much controversy. Some have held that there is a direct communication between the child and its parent by means of continuous vessels ; that there is a direct flow of blood from the one to the other. Others maintain that the mother's blood passes by absorption into the system of the fœtus. There are some, again, who hold that the maternal blood is poured into certain cells placed on the maternal surface of the placenta ; and that, while lodging in these cells, the fœtal vessels select or choose, or remove from it, whatever is needed for the sustenance of the fœtus. This was the opinion held by the Hunters. Lastly, another school believe that the fœtal vessels are in close apposition with those of the mother, but that the maternal blood does not enter the placenta at all.

99. The view now most generally held is this :—The placenta is divided into two parts, the maternal and the fœtal. These are, however, intimately blended, and cannot be separated the one from the other, as is the case in the lower animals. There is thus two separate and independent circulatory systems, and no single and continuous stream. It was attempted to demonstrate a continuity of circulation by means of injection projected into the vessels of the umbilical cord ; but when they did pass from the fœtal part into the maternal, it was found on careful examination to have been by extravasation, not by a continuous canal. A fair argument, too, in favor of two circulations lies here—that in examining the blood of the parent and that of her offspring, the fœtus, it is found to differ considerably, both in the size and relative number of the red corpuscles, and also as regards the amount of fibrin and albumen : non-continuity, then, but intimate alliance. The arrangement is this : 1st. On the fœtal side, the umbilical arteries terminate in the umbilical veins, and not in the vessels of the uterus. 2nd. On the maternal side, the blood of the mother is poured by the curling arteries into certain cells, from which it returns to the mother again by the uterine sinuses or veins. In these cells the fœtal placental vessels dip, and thus the fœtal blood is acted upon by that of the parent. Two currents, then, but quite distinct, and interchanging good offices through a membranous wall. Hunter's view, then, is correct. We may give W. Hunter's own words : "It seems," says he, "incontestible that the human placenta, like that of the quadruped, is composed of two distinct parts, though blended

together, viz., an umbilical, which may be considered part of the fœtus, and a uterine, which belongs to the mother, and that each of these parts has its peculiar system of arteries and veins ; that the circulation through these two parts of the placenta differs in the following manner : In the umbilical portion the arteries terminate in the veins by a continuity of canal, whereas, in the uterine portion, there are intermediate cells, into which the arteries terminate, and from which the veins begin." Further, he adds, "In separating the placenta from the uterus, which is commonly practicable with the least imaginable force, all the vessels are torn through, and then each broken vessel has an open mouth upon the inner surface of the uterus, and a corresponding orifice on the outer surface of the placenta."

100. **Weber's View.**—This able physiologist, though agreeing mainly with Hunter, gives a slight modification of it. He says that "the large vessels which leave the uterus to pass into the decidua are deprived of all except their innermost tunics, which are as soft and tender as coagulated lymph. The veins form a network, and have this peculiarity, that they became wider the more deeply that they penetrate between the lobules. Thus the veins themselves form cells, or sinuses, into which the fœtal villi project. The delicate and yielding coat of the vein is borne inward by each villus pressing upon its exterior, and so is itself the covering of all the villi which compose the fœtal lobules, and which seem to project into its exterior." The opinion of W. Hunter was also confirmed by Dr. Reid and by Goodsir, whose able experiments in connection with this subject reflect much lustre upon his name.

101. **Placenta in the Lower Animals.**—In the ruminantia it is divided into cotyledons. In the cat it is just a circular belt ; in the mare it is spread all over the inner surface of the uterus. The form varies much ; and Sir E. Home proposed actually to classify animals according to the different forms of placenta.

102. **Function of the Placenta.**—The older authors were of opinion that the maternal blood went direct to the fœtus, and thus nourished it ; but our knowledge of the two circulations has wrecked that view. The after-birth fulfills two offices—a pulmonary or branchial, and a nutritious one. It supplies nourishment to the fœtus in order that it may grow, and also oxygenizes its blood. It is both lungs and a gastro-enteric canal.

103. **What is the Mode of Transmission?**—It is osmotic—through membrane. This has been proved in various ways. Madder has passed between the mother and infant, and other substances, such as ether and camphor. The animal poisons are thus also transmitted, such as that of scarlatina and small-pox ; for infants have been born with these diseases, or the evidence that one or other has existed *in utero*, such as the "pitting" left by the latter disease. Malarial poison has also passed to the infant in this way, as has been indicated by its peculiar tremors in the womb. Sir James Simpson was wont to mention an instance showing how disease could in the same manner be transmitted from the fœtus to its mother. A gentleman had syphilis when young, and afterward married, and cohabited with his wife many years. The lady only became affected by the disease on becoming pregnant, for before this no symptoms of it were evinced. The child was born with the disease. We have seen more than one case exactly parallel. Analogical proof of transmission through membrane has been furnished by Mr. Savory of London, who injected the fœtus of a cow with strychnia. The mother was affected by it, but not the other fœtuses. This is a clinching piece

of evidence. How is the process of nutrition carried on? We shall let Goodsir tell, for he has done it ably; but first a sentence about the nutriment obtained in this way by the fœtus. It is not blood that it receives, but a milk-like material elaborated out of that of the parent. This is contained in the cells in which the chorionic vessels ramify. Although it has not been analyzed, it is believed to be of the nature of milk, and this view is plausible. Cases have been met with where, the mother having suffered from pleurisy in the early part of pregnancy, a milky fluid has been found in the pleuræ.

104. **Goodsir's Description of the Process of Nutrition.**—One of the best descriptions of the manner in which the system of nutrition is carried on has been given by Goodsir. He views the cells derived from the decidua and chorion, and the vessels of the villi, as similar in function to the cells of the intestinal villi. The maternal layer is supposed to grow continually by the assimilation of material from the maternal blood. As these cells become mature they burst, and their contents, which are of a milky appearance, pass into the space between the two layers of cells, new ones developed from the germinal spots being formed to succeed them. This cavity, therefore, between the maternal and fœtal portions of the villus—between the two layers of cells—may be viewed as the digestive part of the placenta. In regard to the branchial function, the vessels of the villi supply the place of the capillaries of the lungs. The maternal blood may be looked upon as the atmospheric air, for it is presented to the vessels of the villi of an arterial quality. Oxygen can thus pass into these, and carbonic acid, or other excrementitious or effete material, pass out and into the system of the mother by endosmosis and exosmosis; and thus the blood of the fœtus be kept in a condition fitted for its preservation and healthy development.

105. **Site of Placenta.**—The placenta may be attached to any part of the internal surface of the uterus. The posterior surface of the body is a common part, and it is also frequently at the fundus. It is most frequently at the left side; next on the right side. By means of the stethoscope we may map out the site of its attachment pretty well. In very rare cases it is placed at the neck of the womb, or even over the os, forming a critical complication, as shall be noticed further on.

106. **Varieties of Placenta.**—The cord, as before said, is usually placed about the center of the cake, but at times it passes in at the edge. This is termed the battledore placenta. In plural births, a distinct afterbirth, funis, and a bag of membranes are formed for each child. The twin-placentæ are usually joined at their edges, and when viewed on their maternal aspect, one might think that there was only one. But the vessels of each are distinct and separate, and do not anastomose, and the circulations are, of course, independent. By this arrangement experience teaches us that though one child may perish *in utero*, the other may go on to a healthy maturity; though one may be feeble, the other may be strong. A caution may be given in connection with the placenta whose funis is inserted at its edge. When removing it, if that should be necessary, little traction should be made in case of severing it.

107. **Morbid Conditions.**—Although the placenta is an organ of low type, being destitute of lymphatics, vasa vasorum, and nerves, yet it becomes a prey to disease. Atrophy, hypertrophy, apoplexy are met with; and calcareous, fibrinous, and fatty deposits dot its surface or permeate its structure. Gritty material, composed chiefly of carbonate and phosphate of lime, is often observed.

108. **Fatty Degeneration of the Placenta.**—But more important than these little deposits is that condition now so well known as Fatty Degeneration. Much light has been thrown on this subject by Dr. Robert Barnes; and his two papers on the subject (Med. Chirurg. Trans., vols. 34 and 36) are exceedingly worthy of perusal. In this condition of the placenta, the lobes, instead of presenting the red spongy texture of a normal specimen, exhibit a yellow and fatty appearance. A minute examination shows the following changes: 1st. The villi studded with countless spherules of oil; 2d. Chorion much altered, thickened, and destitute of nuclei; 3rd. The walls of the vessel cease to contain nuclei, perhaps having degenerated into spherules of oil; 4th. These spherules of oil are contained, some in the chorion, some in the walls of the blood-vessels, and many in the spaces between them; 5th. The vessels are destitute of blood. The cavities of the vessels do not contain fatty deposit. This fatty degeneration interferes with the nutrition of the fœtus, and often occasions its death. I have met with a great many instances of it, and where it compromised the life of the child. In some of these the infants were quite bulky, though blanched and waxy-looking; and I should imagine that it kills as much by arresting the branchial function as by interfering with the process of nutrition.

109. **Yellow Induration of Placenta.**—Inflammation likewise attacks it. Lymph is thrown out and effused into its substance, giving rise to this hardness. If it be poured out on the uterine or maternal surface, we may have the placenta adhering to the wall of the uterus. If on the fœtal surface, it may adhere to the child. Placentitis may also result in purulent matter. In placentitis there is generally pain complained of over the uterus or lumbar regions, rigors, fevers, sometimes vomiting. The inflammation may cause the death of the fœtus, or lead to malformation, besides operating injuriously on the mother.

110. **Atrophy and Hypertrophy** may also overtake the after-birth, and tumors may be deposited on its surface. Sir James Simpson wrote ably on this. The tumors, tubercles, and white spots observed on the placenta, were due, he believed, to coagula of blood becoming transformed. Further, he thought these coagula were the result of congestion, to which also the placenta is liable. It is the opinion of Dr. Druitt and others that fatty degeneration of the placenta is a natural process; in short, that it is the manner of dying of a deciduous organ. If we subscribe to this doctrine, we must also hold that, in those cases where it destroys the infant, the "natural process" must have run sad riot—must have been either premature or too extensive, for surely that can never be natural which destroys.

Gangrene of a portion of the placenta has also been met with, and hydatids. None are so liable to compromise the life of the child as the fatty placenta.

111. **Treatment.**—The treatment of fatty placenta forms a pretty satisfactory page in medicine. It is by means of chlorate of potass. Grains 30 are given on an empty stomach several times daily, and continued for months. The *modus operandi* of this medicine is not clear. It was thought that it parted with its oxygen, and thus supplied a deal of this gas to the blood; but this cannot be, for it remains undecomposed. It must, then, in all likelihood prove beneficial by enabling the blood to appropriate an increased quantity of oxygen from the air. We know that the addition of alkaline salts to the blood helps to promote its arterialization; so the chlorate may act in that way. I have of late tried

other alkalies, such as potass. bicarb., with good results. As regards the good done, we find that in numerous cases women who have had a number of still-born children, by a persistence in this treatment have brought forth infants who have lived and thriven. Do not neglect this excellent remedy then in such cases, but place the infant, as has been well said, in a better and purer atmosphere by giving the salt to the mother. If not, if child after child perishes, recourse must be had to the induction of premature labor about the 7th or 8th month. Impending feebleness may be detected by the stethoscope, and thus the fit time chosen. Lowness and depression of the heart's action indicate it.

112. **Funis.**—The funis umbilicalis, umbilical cord, navel-string, or "rope," runs from the navel of the child into the placenta. It is the vehicle by which, or through which, the umbilical arteries and vein are transmitted. It varies in length greatly. Sometimes it has been found only from 6 to 8 in. long; at other times it has extended to 5 feet. The average length is 20 inches. When pretty long, it is common to find it coiled around some portion of the child, usually the neck, from once to twice, thrice, or even a greater number of times. Other parts of the body may be snared in its folds, and sometimes the constriction involved is so great as to lead to amputation of the part. When death is occasioned to the child by this, it is owing to the obstruction of circulation in the funis from the over-stretching of it. I give a cut of a case (see fig. 9). The funis was coiled three times round the abdomen, just immediately below the navel, and was exceedingly tight. The circulation was completely arrested. The cord was black. The child was well developed, and had only perished a week or ten days before delivery. The coiling is usually in a certain direction, according to the direction of the twist in the funis itself. Thus in the left-hand twist of the funis it coils toward the right, and *vice versa*. The twistings of the cord, which run from left to right, have occasioned much speculation. Haller thought they were owing to the greater length of the arteries, within a limited sheath; hence they had to twist around the shorter vein; but in that case there would require to be a different twist at both extremities of the funis. Others say that it is owing to the greater impulse of the blood in the arteries than in the vein. Dr. Tyler Smith thinks it is caused by the movements of the fœtus, the placenta being a fixed point.

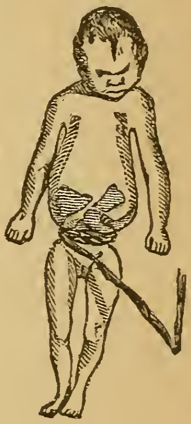
FIG. 9.

113. Goodsir was wont to say that there is a great law of spirality extending through organized nature; and doubtless, both in the organic and inorganic world, numerous examples can be adduced. When the cord is first formed, we should have noted, the vessels are straight; they run straight from the fœtus to the decidua. There are some cases, but very rare, where the straight condition lasts during gestation. When this is the case, the funis is short. The circumference of the cord varies very considerably, depending on the amount of gelatinous matter (gelatine of Wharton) which is contained in it (in reticular cells), and which goes to make up the chief part of the cord. The use of this gelatine is evident; it is padding of a soft nature, and protects the vessels from the risk of fatal compression.

114. **Vessels of the Cord.**—The vessels of the cord are three in num-

ber—viz., two umbilical arteries, and one umbilical vein. The arteries are of greater length than the vein, being much more tortuous. They run in a spiral form (the result of rotation), the arteries around the vein, and from left to right. Occasionally knots are found on the cord. These are very likely produced by the fœtal movements, during some of which it may pass through a loop thus made. The cord is covered by chorion internally, and amnion externally. No valves exist in the umbilical vein. In its capacity it is equal to the two arteries. The arteries pulsate pretty strongly and quickly (about 140 in a minute), and the pulsation is probably due to the heart, although some have thought it partly independent of the cardiac action. The blood flowing in the vein is somewhat lighter than that contained in the arteries, according to some, while others assert that the difference is hardly perceptible. If not in color, however, it differs in properties; for before it is returned by the vessels it has, as we have seen, been subjected to the influence of the maternal blood. Some cases have been met with where only one umbilical artery existed. In such instances its calibre was doubled. It is very rare to find more than one vein. Besides the vessels, the cord contains the duct of the umbilical vesicle and the urachus, the omphalo-mesenteric vessels, and, at a very early period, the fœtal intestines at its fœtal end. Lymphatics exist in it, but not nerves, or otherwise we should inflict pain on cutting it through, which is not the case. The rapidity of the circulation in the cord varies, being influenced by causes connected with the fœtus, and also with the mother, such as emotion.

115. **Abnormalities.**—Some instances are recorded where, in place of two arteries and one vein, this was reversed, there being two veins and one artery. Again, two cords have been found attached to one placenta, and yet only one child. The vessels have sometimes been occluded, partially or wholly; and there have been rare instances of the absence of funis and umbilicus. In the case of an acephalous fœtus, the cord was found inserted into the neck, near the angle of the jaw, the vessels passing down behind the clavicle through the chest, and disappearing in the abdomen. In plural births, as before stated, the cords, like the placentæ, are usually distinct, but sometimes a branch passes from one to the other. The cord has been found so much twisted and knotted as to impair the circulation and the nutrition of the fœtus. The vessels have been seen in a varicose state, and have ruptured and given rise to hemorrhage. Hydatids have been found within the sheath of the funis. In cases of imperfect closure of the umbilical ring, a portion of the intestines has been found protruded within the sheath.

116. **Urachus.**—The urachus is a duct which arises at the fundus of the bladder, and passes out of the body of the fœtus at the navel. It follows the blood-vessels as far as the membranes of the ovum, and continues its course until it terminates in the allantois, which lies between the chorion and amnion. It is pervious in the early part of embryonic existence, thus establishing a communication between the bladder and the allantois. At the full period of pregnancy it is impervious. It is not commonly continued along the cord, but may sometimes be traced upon it.

117. **Allantois.**—This is a vascular, pyriform bladder, which arises from the anterior part of the posterior extremity of the mucous layer, which is closing to form the intestine. It is a growth of the intestine, and develops rapidly. It can only be detected in the earliest period of utero-gestation—at least in the human subject. It passes between the

amnion and chorion, and approaches and applies itself to the latter. Its purpose is to conduct the umbilical vessels forward toward the external surface of the ovum, and thus to establish communication between the circulatory system of the embryo and that of the mother, and so aid in the formation of the placenta. So soon as it reaches the chorion, this membrane puts on very speedily a vascular appearance, and the vessels of the placenta quickly grow. It then rapidly disappears. When the fœtal abdomen closes, the sac of the allantois becomes strictured at the umbilicus, and as the funis grows it becomes compressed, until at length it is a mere impervious cord. That part of it remaining within the abdomen of the embryo is developed into the bladder.

118. **Fœtus.**.—We shall not here enter minutely into the development of the fœtus, but simply give a few particulars which are of undoubted obstetric interest and importance. At the termination of pregnancy the length of the fœtus is from 18 to 24 inches, and its average weight is about 6½ lbs. The weight perhaps differs more than the length, very often being either under or over this amount. Males weigh more than females. The average weight of 50 males born in the Edinburgh Maternity Hospital (according to Sir James Simpson) was 7 lb. 9 oz., and the average of 50 females was only 6 lb. 12 oz. The average length of the males was 20 in. 5 lines; that of the females 19 in. 10 lines. It may be remarked in passing that this matter—the size of the child—has an important practical bearing, for male labors are more trying and injurious than female. But more of this further on. Instances of gigantic children being born, and complicating labor much, are recorded. Merriman met with one of 14 lbs., so did Scanzoni; and the late Dr. Ramsbotham saw one of 16½ lbs. The largest on record is one of 17½ lbs. I have not met with one exceeding 13 lbs.

119. **Difference between the Fœtus *in utero* and the Child when Born.**—1. The blood differs. The globules are larger. It contains less fibrine, and the serum is more watery. It is of darker color, and contains less saline matter. 2. Bile. This is of a deeper hue, and in larger amount. 3. Contents of bowel. Fæces is of a tarry color and consistence (meconium). It is larger in amount, and has at times accumulated so much as to impede labor. 4. Urine. This usually fills the bladder, but may gather to such an extent as to distend it until it ascends to the liver. In that case the ureters expand greatly, as well as the kidneys, forming "cystic kidney," which may also delay labor. Sugar exists in the urine of the fœtus, and some albumen. 5. Stomach. This is distended with gelatinous fluid.

Other differences as regards the two are these: The fœtus *in utero* is surrounded by a bag of membranes. It possesses a Placenta, Umbilical arteries, Ductus arteriosus, Ductus venosus, Foramen ovale, Eustachian valve, papillary membrane up to 7th month, Wollfian bodies and vesicles, and omphalo-mesenteric vessels.

The relative size differs also between the fœtus and the adult. The skull and upper half of the body are proportionately greater. The liver is larger, the left lobe being nearly as large as the right. This large size, persisting up to 4 or 6 years of age, has given rise to suspicions of hepatic disease. The lungs are smaller in the fœtus. The Thyroid and Thymus glands, and supra-renal capsules, are larger proportionately, resembling the conditions in hibernating animals. The uterus is double, the testicles abnormal. The bones of the fœtus are much more numerous also.

120. **Head of Fœtus, Dimensions, etc.**—The fœtal head is divided by obstetricians into regions, diameters, etc. Its shape is ovoid. The regions are five: 1. Vertex or summit. 2. Occiput. 3. Two lateral regions. 4. Face. 5. Base. The diameters are six in number: 1. The longitudinal, or occipito-frontal, 4 to 4½ inches. (See fig. 10, 1 to 2.) 2. Transverse, or bi-parietal, 3½ to 4 in. 3. The occipito-mental or oblique (see fig., 3 to 4), 5 in. 4. The cervico-bregmatic (fig., 5 to 6), 4 in. 5. Fronto-mental, 3½ in. (fig., 7 to 8). 6. The inter-auricular, 3 in. The skull does not give a correct idea of the shape of the fœtal head. When clothed with soft parts, it is more of an egg-shape. The occipito-frontal circumference of the head is about 14 in., and the occipito-mental about 16 in.

The measurements vary a little during labor, owing to the yielding and compressible nature of the cranium. The bones at the base and those of the face are more highly ossified and unyielding.

121. **Fontanelles.**—The fontanelles are two in number. 1. The anterior, at the junction of the sagittal and coronal sutures. This is the greater one. It is of a diamond or quadrangular shape, and about the breadth of two fingers. It is popularly termed the "opening of the head;" and the pulsation felt and seen through this membranous part often alarms the old women, who imagine that some head trouble has seized the child. The posterior, or smaller fontanelle, at the junction of the sagittal and lambdoidal suture, is triangular in shape. This is the opening of most importance to the student, and he ought to become familiar with it and its surroundings. The anterior has four angles, and the posterior only three. When we detect this latter, we know that the vertex is presenting; if we feel, on the contrary, the larger diamond-shaped space, the presentation of the brow is indicated—a much less desirable part to come down first.

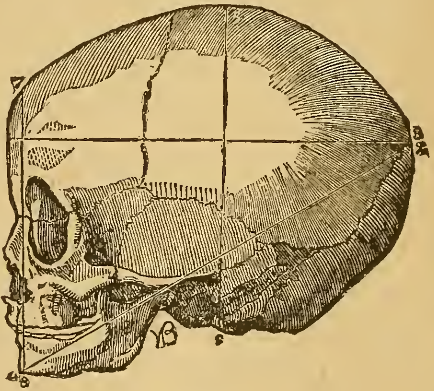

Fig. 10.

122. **Sutures.**—The sutures also should be familiar to the obstetrician, seeing that they guide to a knowledge of the position of the head. For example, if we make out the sagittal suture traversing the pelvis diagonally, we conclude that the long diameter of the head is in the direction of one of the long diameters of the pelvis—and that is how it should be: but if it runs across the brim in a line antero-posteriorly, then the head is situated with its long diameter in the short diameter of the entrance

of the pelvis, and thus is in an impracticable position. Coronal, sagittal, and lambdoidal, then, should be well known.

With reference to the compressibility of the cranium, this, of course, is an extremely wise provision, as it may thus worm its way through a pelvis which it would be impossible for an unyielding skull to pass. The yielding capacity is greatest in the lateral diameter; and it is believed that in this direction the head may be lessened half an inch without compromising the safety of the child. This compressibility of the head reads a lesson of caution; for one may sometimes be tempted in a tedious case to apply the forceps without waiting for the overlapping of the cranial bones. The late eminently practical Dr. Hamilton (M.S. Lectures, 1821) was under the belief that the compression of the cerebrum during labor had a paralyzing effect on the child, throwing it into a state of stupefaction, and preventing it struggling, and injuring the maternal structures. This is very questionable. As regards the struggling, how can it be done when the uterus has the fœtus in its severe grasp? Severe it is; for in cases of version we have felt its power, and the impossibility of flinging about. For fœtal inaction there is no need for stupefaction; passiveness is amply insured by the strong contractions of the womb.

123. **Signs of Fœtal Maturity—Viability.**—The child should be able to cry (and generally does so lustily) when it comes into the world, or soon thereafter. The hair, nails, and eyebrows should be well developed; the mouth, nostrils, eyes, and ears quite open; the cranial bones tolerably solid; and there should not be too much space existing between the fontanelles. The body should be of a pretty bright-red color, and the limbs ought to possess strength to enable them to move with vigor. Power of easy deglutition should also exist; and the child ought to be able to grasp the nipple readily. Meconium should pass away from the bowels soon—say in a few hours at most.

124. **Marks of Non-Maturity.**—Immature children have a feeble cry, or do not cry at all, and move their limbs feebly, if at all. They fail to grasp the nipple, or if, after fumbling, they do so, their sucking is imperfect and badly sustained. They are under the usual dimensions, both as regards length and volume. They are of an intensely red hue, and the roseate blush is broken here and there by bluish streaks and dots. Their heads are covered with down; their eyebrows and nails are not fully developed. The cranial bones are soft, and the fontanelles and sutures unusually wide. They sleep too much, and moan continually. Their temperature becomes speedily low, unless artificial heat be applied; and the meconium is discharged imperfectly, if at all.

Few children survive before the 7th month; only a few cases are recorded where they survived after being born at the 5th and 6th month. Many even of the 7th-months' children perish. There is a popular opinion that 8-months' children do not get on so well as 7-months' ones, but we have not found this to be the case. A child is not deemed viable until about the 7th month.

125. **Sex.**—As regards the proportion of the sexes in Europe, the males predominate. Rustic pursuits, arcadian life, are more favorable to the production of males than the hot and seething town, with its smoke and turmoil, its sedentary and in-door pursuits, its dissipation and carking cares. Rural life is prolific of boys, then, and city existence of girls.

The proportion is also dominated or controlled by the relative ages of man and wife. When the husband is young and blooming, and the lady a good deal older, there is a tendency rather to girls; and when the gentleman is elderly, and his partner youthful, there is likely to be a majority of boys.

Season asserts also a certain sway. There is an excess of males in winter. So, when the man's head and the earth are frosted, thick come the boys. Season seems also to affect the number of births to a small extent. More conceptions occur in spring than during the other seasons.

Twins, etc.—The average number of twins is about 1 in 80. The average number of still-born children is about 1 in 20. The number of still-born males is greater than that of females. This is owing to the larger size of the head leading to more protracted labor.

CHAPTER VII.

POSITION OF FŒTUS IN UTERO.

126. **Position of Fœtus in Utero.**—The position of the fœtus in the womb (or rather the cause of it) has given rise to much ingenious speculation. The usual position is with the head lowest, and presenting over the os. Hunter said it was owing to the greater weight of the head, and the theory of gravitation was widely held. The teaching of the ancient "great ones gone"—Hippocrates and Galen—was, that the child made a somersault about the middle of the seventh month. Ambrose Paré and Mauriceau thought it was owing to efforts of the fœtus to escape from the uterus; and M. Dubois said it was the result of instinctive or physical and voluntary determination on the part of the child. In reference to the gravitation theory, it was supposed that the greater weight of the head led to its sinking down in the liquor amnii; but from experiments made by Dubois, where a fœtus was suspended in a bath shaped like the uterus, it was the scapula, or the back, which first touched the bottom. An argument against the view that it is the greater specific gravity of the head that causes its presentation, is found in cases of intra-uterine hydrocephalus. There the head is much heavier than usual, but yet it is found that preternatural presentations occur often here. This was found by Dr. Thomas Keith, the eminent ovariotomist, while investigating the question of hydrocephalus as a cause of rupture of the uterus: 11 out of 69 were abnormal presentations.

127. The late Sir James Simpson entered fully into it in a paper (Obstet. Works, vol. ii., p. 81). He views the position as a vital action, and dependent, therefore, on the life of the child; not a mechanical result due to the greater weight of the head. He says: "1. The usual position of the fœtus, with the head undermost, is not assumed until about the sixth month of the intra-uterine existence, and becomes more frequent and certain from this period until the full time of pregnancy. 2. Both the assumption and maintenance of this position are vital and not physical acts, for they are found dependent on the existence and continuance of vitality in the child, and being lost by its death. 3. In human physiology we do not know or recognize any vital power or action, except muscular action, capable of producing motions calculated to alter or regulate the position either of the whole body, or any of its

parts; and further, the motory muscular actions of the fœtus are not spontaneous or voluntary, but reflex in their nature, causation, and effects. 4. The position of the fœtus, with the head placed over the os, is that position in which the physical shape of the normal and fully-developed fœtus is best adapted to the physical shape of the normal and fully-developed cavity of the uterus. (Both of them are ovoids.) 5. This adapted position of the contained body to the containing cavity is the aggregate result of reflex movements on the part of the fœtus, by which it keeps its cutaneous surface withdrawn as far as possible from the causes of irritation that may act on it as excitants, or that happen to restrain its freedom of position or of motion." This theory then is, that there is an adaptive vital reflex action which maintains the fœtus in the position which it assumes also as a vital act. That it assumes this position, with the head lowest, is perhaps owing to the fact that its physical shape in said posture is best adapted to the physical shape of the womb. The uterus is ovoid, and so is the fœtus in its ordinary way, flexed and doubled up into an ovoid mass. One end of the fœtal ovoid is formed by the head, the other by the breech. The view is a very plausible one. It derives strong support, too, from the fact that when the child is dead, and consequently the adaptive vital reflex action has ceased, the presentation is frequently abnormal. I have met with a good number of such cases, and instead of being cephalic, they were footling and transverse cases for the most part.

128. Scanzoni found that, of 20 premature births, only 6 presented by the head. Cazeaux, it may be stated, regards the position of the child as a mechanical arrangement. We may enumerate the objections to the theory that the depending of the child's head is due to gravitation. 1. The infant is not suspended by the funis from the fourth month onward, because the cord is double the length of the uterus. 2. The theory implies that the woman is uniformly erect, whereas, perhaps, nearly one-half of the time is spent in the recumbent posture. 3. Suspension of the child by the neck does not alter its position. 4. When the child's head is enlarged, and rendered heavier, as in hydrocephalus, it is found often not to present cephalically. 5. Anencephalous children (with brain wanting) often present by the head. 6. When the child dies *in utero* the presentation is frequently abnormal. Before the seventh month the fœtus has not taken up a stable position, so, if it die, it may retain just the position existing at death.

CHAPTER VIII.

SIGNS OF PREGNANCY.

129. **Signs of Pregnancy.**—This is a very important branch of obstetrics to the physician, not only because the pregnant condition may regulate his actions in certain contingencies of disease, but also owing to the fact that he is often called upon to pronounce in regard to its existence or non-existence, in cases involving the gravest interests. His decision, in some instances, may awaken intense felicity; in others it may enkindle the most profound grief, and bring the ghastly skeleton of

discord and hatred into a hitherto happy home. Were the physician, moreover, to commit a blunder of diagnosis, and say that pregnancy existed when it did not, he might occasion, on the one hand, an unfounded elation, or, on the other, unwarranted misery and grief. Then as regards disease, if he falsely imagines his patient to be pregnant he might abstain from the use of the very means her malady required to combat it; or, on the other hand, ignoring the existence of the gravid state, he might resort to treatment calculated to occasion abortion. At the earlier months of pregnancy, diagnosis is difficult, or even impossible, and much caution is needed in giving an opinion. Women often increase the difficulty, or attempt to do so, on the one hand, by strong protestations of innocence when not innocent (that is, when actually pregnant); and on the other, by assertions of the existence of pregnancy when that state does not exist. In both instances the false statement is the offspring of the wish. It is best not to give too ready an ear to them. Many instances might be given of females hiding their pregnancy to the very last moment, even to the time that their labor pains were upon them, which pains they declared were due to bowel-complaint, but there is not space. Examples of an opposite kind are also numerous. We refer to those cases where ladies, anxious to have offspring, delude themselves into the belief that they are pregnant. Mariceau mentions several women who fancied themselves to be with child for whole years together, and still expected to bring forth. Dionis also relates similar cases, where wind in the belly was viewed as the movements of a fœtus. Women who marry when pretty well up in the years are very prone to such fancies. Some have gone the length of preparing magnificent raiment—baby-linen of great value, when there was nothing to clothe but wind, nothing to bind but air, which not even a wizard could adorn. Physicians have been obtained, nurses have been retained; nay, even the baptismal ceremony has been spoken of, and all for mere flatus in the bowel. But we must proceed to the signs. It is common and best to notice them in the order in which they appear. They are numerous, but the most conclusive are only one or two.

130. **Suspension of the Menses.**—This is one of the earliest striking signs, one that impresses the female most, if she has had connection. It does not, however, by any means announce pregnancy. Its value is impaired by the following considerations: (1). The menstrual discharge has in some women recurred regularly during the whole term of pregnancy. Many authors report such. In others, it appears once or twice after fecundation. (2.) The catamenia may cease apart from and independent of pregnancy. Sudden cold may suspend the function, or profuse discharges from other parts of the body, say chronic diarrhœa, or ulcers, ovarian disease, phthisis, etc. Daventer and others have noticed singular cases where the catamenia appeared only during pregnancy. Dr. Elsasser (of the Stuttgart *Gebärhaus*) recorded 50 cases where it occurred once in 8, twice in 10, thrice in 12, 4 times in 5, 5 times in 6, 8 times in 5, and 6 times in 2 instances. It happened oftenest in primiparæ. (3). Another invalidating element is this: that females sometimes conceive before the catamenia appears at all; others, again, when it is suspended by lactation; and others where it had apparently ceased toward the change of life. In connection with this we may notice that some unmarried females, who have unfortunately become pregnant, have been found simulating the menses by the use of blood, in order to conceal their misfortune for a time. Blood drawn from their

own persons or from cattle has been used wherewith to stain their linen every month.

131. **Morning Sickness; Vomiting, etc.**—This is an early and frequent concomitant of pregnancy. There is a close sympathy between the stomach and the uterus, and it frequently happens that this intimate alliance is asserted or manifested just after conception. There is nausea, sinking at the epigastrium, flatulence, acid eructations, retching, and vomiting. The sickness, the sinking, and the retching, are generally most severe when the woman rises in the morning, the assumption of the erect posture seemingly provoking these—hence the term "morning sickness." Some women, however, have the nausea at all hours of the day, and reject almost every meal; while others experience few, if any, gastric disorders. In addition to functional disturbances, peculiar sensations arise; and there will sometimes be an intense craving for articles of diet that would be spurned in the non-gravid state (raw turnips, onions, carrots, dry oatmeal, lemons, raw rhubarb, mineral substances, and even unsavory unmentionables), and a hatred of delicacies, or the ordinary diet previously relished. The retching and vomiting in some instances are indescribably severe and distressing. We have seen them continue during the whole period of gestation, and it seemed almost a miracle, not only how the female survived, but how she retained her infant, and expelled it at the full period, not badly nourished after all. Plump comes home the child often, even when its mother has been living apparently for nine months on air. In general, the morning sickness lasts only about half an hour to an hour; and often it extends only to the third or fourth month, ceasing at the period of quickening. When the vomiting begins just after conception, it has then a greater tendency to last throughout the whole period of pregnancy.

132. **Bad Consequences of the Vomiting.**—While in many females this sickness and vomiting appear to entail not the slightest evil, there are others seriously affected by it. In some there is a hot and dry skin, with fever, debility, and emaciation; in others, head symptoms supervene. There may be violent headache, delirium, and even fatal coma. Hallucinations are also common. Abortion occurs frequently (with relief to the symptoms), and, in not a few cases, even death results.

133. **Causes.**—These have been variously viewed. Negrier believed it due to inflammatory irritation of the cervix. Bretonneau thought it due to a spasmodic rigidity of the uterus, which impeded the dilatation of the uterus sufficiently fast enough for the growing contained body. Kiwisch believed it due to a preternatural susceptibility of the nerves of the stomach. Frerichs imputed it in part to albuminuria and uræmia. Hohl pointed out that, in some cases, it was due to a retroversion at the third or fourth month. (We have published some cases of this displacement, but there was no great gastric irritation.) Virchow thought that tight lacing, by squeezing the liver, occasioned it indirectly in some cases. We might add that pregnancy itself, by causing pressure on the various viscera, liver, spleen, and stomach, may, by interfering with their function, be a probable cause.

134. **Diagnosis.**—The vomiting of pregnancy may be confounded with one or two other affections. There is dyspepsia. Well, in this latter there is headache, anorexia, and fever, while these are usually absent in pregnant cases. The female may retch and vomit what she partakes of, but, on the back of it, she is ready to devour with avidity and zest a fresh meal. With gastric ulcer we cannot well confound it. In ulcer

we have stomach pain developing gradually, and vomiting of blood. In cancer we have the hard tumor painful on pressure, and frequent lancinating pains, with coffee-ground vomit, and a history, in all probability, of chronic dyspepsia, and gastric pain prior to pregnancy.

135. **Treatment.**—This we would have the student master carefully; for, although he may often fail in achieving good, he will be often asked to do something in the severer cases. In the milder forms ladies bear with it wonderfully well, thinking, perhaps, that it must be, and consoled by the thought that a child is at the foundation of their troubles. Try a sinapism over the stomach first, with a little soda-water internally, or a little mace tea (mace, 20 grains; water 10 ounces). The woman should rest in bed in the morning and take a light breakfast, such as rusks, or water-biscuits, with weak tea, and nutmeg in it. Her dress should sit lightly upon her. When these simples fail, try internally the following, in rotation, if need be:—Nux vomica, bismuth, oxalate of cerium, creasote, mustard seeds, brandy and soda-water, champagne, tinct. lavand. co., tinct. assafœt, pepsine, spt. ammon. aromat., infus. columbæ, and flor. anthemid. One or other of these may appease, and if so, we are grateful. The liver and the bowels must be acted on by means of podophyll: rheum: hydr. cum. cret.; taraxacum, etc. Various remedies may be tried by the bowel in preference to the stomach, such as an enema of chloral (gr. 30), a suppository of nux vomica, with belladonna, and pessaries of belladonna. If we subscribe to Negrier, we may leech the vaginal cervix; if to Bretonneau, the soothing medicated pessary to the uterus may be adopted. Various embrocations and vesicants may be applied over the region of the stomach—blisters, iodine, the moxa, etc. After blistering, I have dusted into the raw surface a little nux vomica and morphia, with apparent benefit. The subcutaneous injection of morphia might also be tried. Spongiopiline, soaked in brandy, or wetted in a mixture containing a drachm of tinct. opii, and the same of tinct. belladonna, with a little proof spirit, and laid over the stomach, is also serviceable. Sometimes, on the approach of sleep, a little light nourishment will be retained. Sir James Simpson tried the inhalation of tinct. opii. Some cases resist all remedies, not even being alleviated by any of them. When such is the case, and especially if serious head symptoms supervene, the question of inducing premature labor arises. Villeneuve, Braun, Churchill, Lee, and others approve and have practised it; others object. If we ostracize this operation here entirely, we must make up our minds occasionally to have our patient dying in that saddest of ways—with her offspring in her womb. Happily, the fatal cases are few and far apart.

136. **Uterine Changes.**—These we have already noticed at length; but one or two points may be noted here. If the uterus is examined per vaginam just a few days after conception, it is found to be hot and turgid, and the os has a soft and velvety feel. If the finger be placed in the anterior vaginal *cul de sac*, the womb will be found to be enlarged and bulking more, and there is a little ante-version of the fundus. If the speculum be employed, the os and cervix will be seen to be enlarged already, and the light-colored mucous plug may be observed.

137. **Salivation.**—Salivation and pyrosis, reflex secretions, are also sometimes met with. We have seen a case where pints of secretion came away from the glands of the mouth in the twenty-four hours, bed and other linen being soaked with it. Here there seemed to be an unusually intimate sympathy with the uterus and the glandular system,

for other glands were stimulated to increased action. The ptyalism of pregnancy differs from mercurial salivation in this way, that there is none of the peculiar fœtor nor sponginess of the gums.

Treatment.—Belladonna has been found of much service in extreme cases, after the more potent astringents and opiates have been tried in vain. Give the tincture in 15 minum doses, three times a day. I have found the tincture of conium also beneficial.

138. **Mammary Evidences.**—From four to eight weeks after impregnation the breasts are liable to increased action. There is a greater fulness about them, due to the afflux of augmented fluids. They get firmer in texture, knotty, nodulated; and tingle, throb, and become painful. The areola darkens from the deposit of pigment, and enlarged veins are seen coursing over the surface of the breast. This pigmentation, it may be observed, is not always confined to the areola; sometimes it invades the abdomen. Blumenbach gives a case where the abdomen of a pregnant female became quite black. The nipple becomes more tumid and prominent also, and there is a mottled appearance, sometimes also scaly, over the surface of the mammæ. As pregnancy advances these changes are more marked. More pigment is deposited in the areolæ, and the follicles which dot their surface increase in size, and exude a fluid. It has been observed that in women with dark hair and eyes the skirts of the areolæ are marked by white patches, just like what would be produced on a piece of brown cloth with some drops of weak acid. Certain light streaks—*lineæ albicantes*—resembling those on the abdomen, appear on the breast about the 5th or 6th month. Milk appears in the breasts, and may be drawn from the mammillæ, but there is much difference here in different cases. Sometimes, for instance, it appears at the 4th or 5th month, at other times it does not appear until a few days after labor. M. Robin, has given us a new clew to the fellowship subsisting between the breast and the womb. He has pointed out that the development of the uterine fibres during pregnancy is synchronous with, or rather leads to, the development of the glandular *culs de sac* of the mammæ. These sacs are in a state of comparative atrophy during the non-existence of pregnancy, but grow and assume epithelium when the nucleated fibre-cells of the uterus are developing during the gravid state. Great stress is laid by some on the condition of the areolæ, and they allege that we never have this coloring and follicular enlargement with turgesence of the nipple unless during pregnancy.

139. **Elements Detracting from the value of the Mammary signs.**—Mammary excitement and development arise from causes independent of gestation. Fibrous tumors of the uterus, hydatids, disease of the os and cervix, oft-repeated connection, and retention of the catamenia, may each and all occasion it. Milk may exist also in the breast of a virgin, and some cases are reported where it has done so even prior to puberty. Baudelocque gives a case where it appeared at the eighth year, the girl's breast having been milked in presence of the Royal Academy of Surgery, October, 1783. Milk also appears in some females at the period of the menses. (In the Cape de Verde islands, virgins, nay, even old men and women, are actually employed as wet nurses.) Lastly, in multiparæ, the nipple and areolæ are less liable to become tumefied and dark, and therefore are less reliable signs. The mammary changes are also present in females subject to menorrhagia.

140. **Abdominal Signs.**—Enlargement of the abdomen is another sign. It is not the uterus that distends it the first 6 or 8 weeks, for, on

the contrary, this organ descends rather into the pelvic cavity, but it is owing to the intestines being pushed up a little by the growing womb. There is often rather a flattening of the belly the first two months, and this will always be the case if there be not a deal of flatus in the bowel. After this period, say during the 4th month, the uterus begins to rise above the pubis—may be felt bulging a little; and then, instead of an excavation, we have steadily increasing enlargement. As pregnancy advances, the uterus rises higher and higher, until the entire abdomen is distended. We may repeat the changes of position (noticed previously) which the uterus undergoes. The fundus rises above the pubis between the 3d and 4th month. At the 5th it is about the umbilicus, at the 7th it is midway between umbilicus and ensiform cartilage, at the middle of the 9th it is as high as it can go, and after this it descends somewhat, probably by diminishing in its length, and increasing in its breadth.

141. **Right Lateral Obliquity of the Womb.**—Notice this briefly. After the gravid uterus emerges from the pelvis, it assumes in its long axis an obliquity to the right. How is this? Levret thought it due to the implantation of the placenta on the right lateral half of the fundus; but the feet is taken from this hypothesis by the fact that the placenta is often not there, even when the obliquity exists. More feasible is Madame Boivin's explanation. She believed it to be owing to the greater muscularity and shortness of the round ligament on the right side. Further, it has been viewed as a result of the more frequent employment of the right arm, and the greater tendency to repose on the right side. Lastly, the position of the rectum on the left. In multipara the uterus does not rise so high, there being less support afforded by the walls of the abdomen, which very often become very flabby and yielding.

Various tumors of the abdomen simulate the enlargement due to pregnancy. We shall notice these further on.

142. **Frequent Desire to Micturate.**—This is common during the descent of the uterus at the early part of pregnancy, and is due partly to pressure on the neck of the bladder. It is probably, however, in part due to reflex influence; and what strengthens this view is the fact that we have seen it benefited by medicines, which could not have happened had its origin been mechanical. Females get good from a little gin. I give Camphor, Hyoscyamus, and Spt. Eth. Nit. I have met with one or two cases of retention, and on examining found it due to a moderate retroversion. I pushed back the cervix from the neck of the bladder, and ordered rest on the abdomen occasionally.

143. **Quickening.**—This is the first movement of the fœtus felt by the mother. It is not the first movement of the fœtus, but that which is first perceived. The old view was, that this was the moment that life was first breathed into the child—that previous to this it was but an inanimate thing; but that was an absurd hypothesis altogether. The movement is felt about 4 or 4½ months after conception; but some experience it so early as the middle of the fourth month, others not until the fifth. It is just a little pat at first, but strengthens as the infant grows. Though the touch be thus light, it often communicates a great thrill to the system, and females are sometimes sickened on to syncope. They feel in some cases as if subjected to a strong electric shock; but perhaps much of the excitement is due to emotion, consequent on the mother feeling for the first time that within her is a living child. "Quickening" is now variously explained:—1. It is said to be due to muscular contraction; not the result of the will, or a psychical act, but dependent on the spinal

system, and therefore a reflex phenomenon. The child was previously alive, of course, but had only now arrived at a condition of development wherein it possessed the power of movement. 2. The movements of the fœtus while the uterus is in the cavity of the pelvis are not felt, because the uterus is not supplied with nerves of sensation, and is surrounded with parts similarly deficient; but when it ascends out of the pelvis, it comes into contact with the abdominal walls, which are supplied with nerves of sensation, and thus the woman is made conscious of them. 3. Some attribute quickening to the sudden passage of the womb from the pelvis into the abdomen. Cases are mentioned where no movement was experienced the whole time, and yet where a living and healthy child was brought forth. It is not easy to account for these. There would seem to be either unusual apathy on the part of the fœtus or unwonted absence of sensation on the part of its parent.

144. **False-quickening.**—The value of this evidence is depreciated by other sensations. Many married ladies will tell you they feel the movement of a child within them, when in reality they are not pregnant; and they will maintain this as strongly as some unmarried females, when pregnant, will protest that they are not so. No doubt these ladies do experience sensations which they fondly believe to arise from the movements of an infant; but, unfortunately, everything that sparkles is not a diamond. The sensation may be due only to flatus, or to contractions of the abdominal muscles. Dr. Bedford relates the case of a woman (Princip. and Practice of Obstet., p. 181), "Aunt Betty," who declared that she had been pregnant for fifteen years, and she went about making a living, if not her fortune, by showing her "Jack in the box," by exhibiting how the little one jumped in her womb. In looking at the abdomen a good deal of movement was seen, certainly; but it was found that, from long practice, she could cause the abdominal muscles to contract.

The case of Queen Mary of England may be cited as an illustration of how far fancy, fanned and inflamed by the anxious desire to have offspring, may impose on sound sense and integrity. So confident was she that she felt the movements of a child within her that she caused proclamation to be made of her interesting condition. There was wide and general rejoicing at the happy prospect, and offerings and congratulations flowed in from a thousand sources. Alas! it was no child after all, not even wind, but something worse—viz., water,—a case of abdominal dropsy. Hume, the historian, thus alludes to the circumstance: "The Queen's extreme desire to have issue had made her family give credit to any appearance of pregnancy; and when the Legate was introduced to her, she fancied she felt the embryo stir within her womb. Her flatterers compared this motion of the infant to that of John the Baptist, who leaped in his mother's belly at the salutation of the Virgin. Despatches were immediately sent to foreign courts to inform them of the event; orders were issued to give public thanks; great rejoicings were made; the family of the young prince was already settled, for the Catholics held themselves assured that the child was to be a male; and Bonner, Bishop of London, made public prayers. He said that Heaven would pledge to render him beautiful, vigorous, and witty. But the nation still remained somewhat incredulous, and many were persuaded that the Queen labored under infirmities which rendered her incapable of having children. Her infant proved only the commencement of a dropsy," etc.

Many similar cases might be recorded, but it is unnecessary.

The practitioner, then, has to be on his guard, and, as previously said, to take care to rely little on the asseverations of the woman, and more on the various physical signs.

145. **Ballottement, Repercussion, or passive Motion of the Fœtus.**—Another sign of pregnancy, and an undoubtedly valuable one, is the passive movement of the child, or repercussion. It is the forced motion of the fœtus from one part of the womb to another. It may be produced simply by the female changing her position rather quickly—turning rather suddenly from one side to another—when, obedient to the laws of gravity, the fœtus also alters its place. But it is usual to produce the movement in this way. Place the woman in the upright posture, or, if recumbent, have the shoulders well elevated; then introduce the forefinger into the vagina, and as far as the cervix, at the same time steadying the uterus with the other hand. Then quickly jerk up the finger, and the presenting part will be found to recede, and then to return again, and impinge upon, or greet, the finger. This jerk with the finger causes it to move in the liquor amnii, and then it gravitates toward the finger, when the impulse is exhausted. This is undoubtedly a most invaluable sign, for floating tumors are rare. We cannot obtain this sign till about the fourth month, and it is perhaps best observed from the sixth to the seventh month. There are some instances where we will be unable to obtain ballottement at all, such as those where the liquor amnii is exceedingly scanty, and others where the fœtus is lying transversely.

146. **Uterine Murmur or Souffle; Bruit Placentaire; Placental Murmur.**—The placental bruit is another satisfactory index. To M. Kergaradec is due the credit of first calling attention to it. It is an intermitting, whirring sound, something like the cardiac "bruit de soufflet," and like the sound produced by blowing gently on the mouth of a bottle. Its character varies a little: sometimes it is a rasping, or hissing sound, or modification of these and of the whirring sound. It is produced by the passage of the blood into the placenta, in all likelihood; although there are those who think that it is due to pressure exercised on the adjacent blood-vessels by the gravid womb. Those who hold the latter view maintain: First, that the sound is heard sometimes after the birth of the child. Second, that it may be heard in almost every part of the uterus. Third, that a similar sound is heard when pregnancy does not exist, as in cases of abdominal or uterine tumors. A fourth theory is this: that it is engendered by the labored passage of the blood through the turgid vessels of the uterus itself. Fifth, another hypothesis is, that it is produced by the peculiar condition of the blood, as in chlorosis, where, as you will perhaps be aware, similar murmurs are heard over the large vessels. In chlorosis, Dr. Brown-Sequard, the able physiologist, thinks the sounds emanate from a tremor of the muscles; local contractions of the muscles of the womb may therefore give rise to it. Lastly, some say that it results from the difference between the calibre of the arteries supplying the uterus and the uterine sinuses; that the sound is produced by the sudden expansion of the current of blood as it goes from the smaller to the larger vessels. You will find it always loudest over the site of implantation of the placenta, and dying gradually away as you travel from it. If it is not in the placenta itself, it at least indicates its site. This murmur may be heard with care about the fourth or fifth month. Dr. Kennedy says that he has discovered it as early as the tenth week. It can always be made out before the pulsations of the fœtal heart, about which we shall presently speak; and it is heard some

little time even after the death of the fœtus. In reference to the value of the sign, it is rather lowered by the fact of somewhat similar sounds being occasioned apart from pregnancy, as in fibrous tumors, in molar pregnancy, and hydatids. We see, moreover, in women with very attenuated abdominal walls, that if we place the stethoscope pretty firmly down, a similar murmur is heard, proceeding simply from the larger vessels. In some anæmic and hysterical females especially, a very loud *bruit* is heard; so loud, indeed, that you might, unless considerably experienced, mistake it for aneurism. Let it be borne in mind, too, that the absence of the sound is no evidence of the absence of pregnancy, for the placenta may be placed posteriorly, and thus, lying deep, fail to produce a sound loud enough to be heard. The locality where the sound is best heard is just a little above Poupart's ligament, at one or other side: oftener on the left than the right.

147. **Pulsation of the Umbilical Cord, or Funic Souffle.**—It is only in very rare cases that the pulsations of the funis can be heard. Dr. Evory Kennedy, who has made a special study of the auscultation of the fœtus, says that he has been able to hear them. The cord would require to lie between the fœtus and the anterior wall of the uterus, and the abdominal walls would also require to be very attenuated. In a "Banting" it were next to impossible. It is a very feeble murmur, synchronous with the pulsations of the fœtal heart, whereas the placental or uterine *bruit* is in unison with the beat of the maternal heart.

148. **Pulsations of the Fœtal Heart.**—This is the crowning and culminating sign. It was discovered by M. Mayor of Geneva fully half a century ago. The discovery was a great one; a truly golden "nugget" in obstetrics. When we hear this sound there is an end of conjecture or doubt as regards pregnancy; we are certain that it does exist. We may doubt many or all of the other signs, but this one gives the death-blow to scepticism. It has been matter of great wonder how this pearl was so long in being detected, more especially seeing that it lay, as it were, so near the surface, and required no diving into a vasty deep. True, auscultation was not scientifically practised then; but it is strange that some lucky ear was not placed on the woman's abdomen, and thus the prize secured.

Character of the Sound.—It is a sharp, short tick, something like that of a watch slightly dulled. It is a double sound, and the second is loudest and most easily heard. It varies a little in strength, in force, and in rhythm. Its average frequency is about 140 beats per minute, which is nearly double that of the parent. Its frequency diminishes rather as the period of pregnancy draws to its close. The fœtal circulation is independent of that of the mother, yet the fœtal pulsation varies a little, owing to the condition of the parent, emotion, etc., having a certain influence.

149. **The sound is heard best** about the middle of the abdomen, reckoning vertically, and a little to one side, usually the left. The sound will be heard at times over a good space, but as a rule you will not detect it readily very far from the middle abdominal region. The time at which these pulsations begin to be heard is about the end of the 4th month. Naegelé says it was the 18th week in 30 out of 50 cases which he examined. Various conditions may interfere both with the distinctness of the sound and the period at which it is audible, such as thickness of the abdominal walls, redundancy of liquor amnii, and feeble pulsation of the child's heart due to debility. Is there any other sound likely to simulate

this one and so mislead us? Hardly. There are the sounds of the maternal heart, of muscular contraction, and of the arteries of the uterus; but none of these resemble the ones we are considering. After a little experience they cannot be mistaken. The sounds of the parent's heart can rarely be heard down in the locality of the uterus. But granting that they were heard there, they would not confound us, the fœtal sounds being much more rapid and feeble. It has now to be remarked that while the existence of these sounds assures us beyond the shadow of doubt of the presence of pregnancy, their absence cannot lead us to conclude that the woman is not gravid; and for this reason, the fœtus may be dead, or in a very enfeebled condition. Those instances, however, where the sounds are not heard are exceedingly rare. M. Depaul found them absent in 8 cases only out of 1000. In conclusion, it may be stated that these sounds also afford us important information in reference to the position of the child; but of this more afterward.

150. **Kiesteine.**—After the last sign nothing more is required to attest pregnancy, but there is a chain of evidences, and no link need be omitted. In the urine of the pregnant female is found a whitish granular substance, named Kiesteine. When her urine is permitted to stand for some time, thirty hours or so, this white deposit is found. It rises gradually from the 4th to the 6th day to the surface of the water, forming a dull white cloud, cotton-like, or resembling carded wood. It seems to have been known by Savonarola so far back as the 15th century, although it has been more particularly investigated in modern times by Nauche and Eguisier. It has been analyzed, and found to contain fat, a caseous substance, and the triple-phosphate. It disappears a few days after its formation, at which time the urine becomes turbid. The time during which this substance is found to gather in the urine is from the end of the first month to the termination of pregnancy. It is not a very important indication because it is found in some females not pregnant; in some when under a course of cod-liver oil; and, on the other hand, in some cases of pregnancy it is absent altogether.

151. **Jacquemier's Test.**—This is a violet, or port-wine, or mauve color of the vagina and inner surface of the vulva. It results from obstruction to venous return, and, being due to pressure, a pelvic tumor may occasion it as well as the gravid uterus. Dr. Wistrand, Kilian of Bonn, and others, however, hold it to be an infallible sign of pregnancy; that it is produced by compression of the utero-pelvic veins; and that the color is peculiar to pregnancy. Kluge of Berlin, Parent-Duchatelet, and Ricord also think it an unvarying accompaniment of gestation.

Pulsation of Vaginal Artery.—Osiander called attention to this sign, an increased pulsation of the vaginal artery. During pregnancy, and when abortion is threatened, that author says it is increased, both as regards volume and force.

152. **State of the Skin of the Abdomen, and of the Umbilicus.**—There is often found a colored line about $\frac{1}{4}$ inch broad extending generally from the pubis to the navel, or to near the ensiform cartilage. It may be of a brown, ochry, or amber hue. Around the umbilicus also is a dark areola at times.

Sound occasioned by Fœtal Movements.—Naegelé, and then Depaul, noticed this sound. It is a very slight, dull sound or tap, due to the movement of the infant, and may be excited by manipulating the uterus through the abdomen. Dr. Rasch pointed out a sign which he thought would aid the diagnosis of early pregnancy. He says that so early as the second month we can detect fluctuation through the anterior uterine wall, by means of two fingers of the right hand, while the uterus is fixed by the other hand over the abdomen.

Evidences from general condition of the Woman.—The pregnant woman is in general plethoric, and has a fuller and quicker pulse. There is an increase of fibrine in the blood also. There are various mental peculiarities, such as vicissitudes of temper and capricious taste. The skin has been found to change its color, becoming dark or sallow, and sometimes eruptions appear, especially on the face.

153. **Summary of the Signs of Pregnancy in the order of their importance.**—*Comparative value of the different signs, etc.*—The certain signs are—(1.) Sound of pulsation of fœtal heart. (2.) Ballottement; and (3.) Movements of infant. The less certain ones are—(1.) Suspension of menses. (2.) Milk in breasts, areola, and mammary enlargement. (3.) Uterine souffle. (4.) Morning sickness. The remaining are less reliable still.

Pulsation of Fœtal Heart. Cessation of menstruation. Morning sickness. Quickening. Mammary sympathies; milk in breast. Enlargement of abdomen. Ballottement. Uterine souffle. Jacquemier's test—a violet color of the vagina and vulva. Kiesteine in urine. Pulsation of cord, or *funic* souffle. Pulsation of vaginal artery. Salivation. Plethora. Changeable temper; peculiarities of taste. Coloration of skin. Sound from movement of fœtus.

154. **Morbid Phenomena simulating Pregnancy.**—There are various affections which resemble the gravid state in many points, and which may be noticed briefly here. We refer to them at greater length further on. (1.) *Intra-uterine growths.* These, whether fibrous tumors or polypi, cannot perplex one much, because there is generally hemorrhage, the discharge occurring often and profusely, even during the intervals of the menses. They are of slower growth, too, and in general a long period elapses before they enlarge the uterus and abdomen to an extent likely to resemble pregnancy. There may also be a *souffle* with a fibrous tumor, resembling the placental one, but the hemorrhage and the history of the case differentiate it sufficiently.

(2.) *Dropsy of the Uterus.*—This may lead to an enlargement resembling pregnancy; but in this disorder the system is generally involved, and then there will be the absence of the other signs.

(3.) *Uterine Hydatids.*—In this affection there is usually discharge of blood at times, with a good deal of bearing down. There is also a good deal of discharge of water from the uterus periodically. This is viewed as a pathognomonic sign.

(4.) *Physometra.*—This is a collection of wind within the cavity of the uterus, due to a portion of placenta being retained and decomposing, or to a mole or putrid fœtus. It is a very rare affection, and many practitioners have never met with a case. By percussing the abdomen, marked resonance will be elicited; and as gas escapes now and then, the dimensions of the tumor will vary from time to time. The history of the case will also help diagnosis.

155. **Extra-uterine Tumors simulating somewhat the Gravid State.**—Fibrous tumors growing from the outer portion of the uterus are not uncommon. They are generally pedunculated. Mobility characterizes them, and you are often able to grasp them in the hand as you

would a large pear. I have seen cases where, during labor, a tumor pressed up the abdominal wall in so prominent a manner that one would have thought it a case of extra-uterine pregnancy.

(1.) *Ovarian Disease.*—The ovaries often enlarge and fill up the abdomen, just as it is bulked in pregnancy; and, moreover, this affection frequently co-exists with this condition. Ascertain where the tumor began to grow. Here it begins in one or another iliac region; while in pregnancy it begins in the first instance below, in the middle line, and gradually developes upward. If it be a case of dropsy of the ovary, there will be marked fluctuation on percussion.

(2.) *Ascites.*—Ascites, or peritoneal dropsy, is not readily confounded with pregnancy, For, 1. There is general fluctuation over the abdomen; and, 2. It is the consequence of an antecedent or co-existing malady, such as disease of the heart, liver, or kidneys, or of inflammation.

(3.) *Tympanites.*—An accumulation of flatus in the bowel will often occasion immense abdominal distention. Hysterical women are very much subject to it. Percussion elicits resonance here, and then there will always be some gas passing away, either upward or downward, and thus showing the nature of the swelling, as well as lessening its bulk.

156. (4.) **Phantom Tumors—Spurious Pregnancy.**—The most notable example of this kind is that produced in some hysterical females by an irregular contraction of the abdominal muscles. Sir James Simpson was wont to call it pseudo-cyesis. There is generally some menstrual disorder present. The abdomen bulks out largely, and some of the women fondly believe, and firmly declare, that they are with child. The belly sometimes assumes the precise contour of pregnancy, and by percussion we may even elicit dulness, instead of resonance. An examination per vaginam may easily satisfy us, and even by grasping the abdomen firmly with both hands we shall find that there is no solid body like a fully-developed uterus containing a fœtus. But the best way of diagnosing such cases, of expelling the phantom, and dissipating the ghost, is by anæsthetising the patient. Place the deluded female, or the impostor, it may be, under the potent spell of chloroform, and her big belly will disappear like the iceberg when it reaches a temperate clime. The irregular and spasmodic contraction which occasions the tumor is destroyed; the abdomen relaxes and flattens, and all doubt is dissipated.

Fœcal Matter.—This has sometimes accumulated so extensively as to produce a large tumor, but this can hardly mislead.

157. **Summary of the Diagnosis of Pregnancy from other Tumors of the Abdomen.**—Pregnancy is known from fibrous tumors by the duration of the latter, which is longer, and by there being in the gravid state the mammary signs, changes in the os and cervix, auscultatory evidences, ballottement, etc. Polypus uteri, in addition to wanting the other signs, is usually attended with frequently recurring hemorrhage.

Ascites.—Here there is general fluctuation, and percussion gives a clear sound in the flanks. Then there is antecedent or co-existing disease. Absence of other signs; and, per vaginam, there is no uterine change similar to that of pregnancy. Distention of uterus with fluid, etc. History is quite different: then the other signs are absent. In cases of distension with flatus there is clear percussion over the tumor.

Cancer.—Here, while there may be enlargement, there is pain and hemorrhage, and absence of auscultatory signs.

Ovarian Dropsy.—Here the tumor begins to grow at one or other side, There is the absence of auscultatory evidences, and of the changes of the uterus ascertained by the *toucher*.

Distension of Bladder.—In retroversion this has occasionally happened, and a large tumor been formed. The catheter would soon tell the nature of the case.

Fat in the abdominal Walls and Omentum.—The *toucher* and the stethoscope will dispel all doubt here.

Hæmatocele, Pelvic Abscess, Cysts of the Omentum, Fæcal Accumulation.—In these cases there will be neither the usual uterine changes nor stethoscopic phenomena common to the gravid state.

Phantom Tumors—Spurious Pregnancy.—These are made to disappear under chloroform.

CHAPTER IX.

EXTRA-UTERINE PREGNANCY.

158. **Extra-Uterine Pregnancy, or Fœtation.**—It happens in rare cases that the ovum does not pass along the oviduct to the uterus, but is arrested or remains in the ovary. It may remain embedded in the ovary, or fall into the cavity of the abdomen, or be stopped in some part of the Fallopian tube. Coste has stated that woman only is liable to this misplaced gestation; but it has been found among the lower animals. The subject, though noticed by Albucasis, did not receive very much attention until recent times; and we are indebted to some of the Germans, such as Schmitt of Vienna, and Carus of Dresden, for a careful account of the various forms of this misplacement. Five varieties are usually noticed.

(1.) *Ovarian.* (2.) *Tubal, Tubular, or Fallopian.* (3.) *Abdominal.* (4.) *Interstitial or Parietal.* (5.) *Ovario-tubal.*

(1.) *Ovarian.*—This variety has been doubted by some. The doubt arises from this: the question whether it is possible for fecundation to occur before the rupture of the ovisac. Those who say that it cannot be effected without this deny ovarian gestation, maintaining that true ovarian pregnancy can be found only where the ovum becomes developed within the ovary, and this can only happen by the spermatozoa penetrating the ovisac and fecundating the germ, without rupturing the ovisac.

159. (2.) *Tubal.*—This was at one time deemed the most common form, but Hecker of Munich has shown by careful statistics that this is not so. In about 200 cases there were 160 abdominal, including, as he does, ovarian, the remaining 40 only being tubal. Hecker has also investigated the comparative frequency of right and left Fallopian pregnancy, and has been able to confirm the previous opinion, which was, that it is more common on the left side than on the right. The tubal is a very fatal form; one only survived out of 64 cases.

(3.) *Abdominal or Ventral.*—Here the germ is in some part of the abdominal cavity, and develops there. The placenta in these cases indicates the site; and it has been found on the mesentery, in the iliac fossæ, in the recto-uterine fossa, on the broad ligaments, and on the anterior abdominal wall, etc. This is not so fatal a form as the tubal, for of 132 instances, according to Professor Hecker, 76 survived.

(4.) *Interstitial or Parietal.*—Here the ovum, after traversing the whole oviduct on to its junction with the uterus, becomes arrested, and gets embedded between the uterine fibres. Instead of entering the cavity of the womb, it gets ensconced in its substance. Breschet, who first described this form in 1824, held that the embryo slipped into the opening of some of the venous sinuses, which he fancied existed near the uterine end of the Fallopian tube, but on searching for these they are not to be found. This is a rare form. It is also very fatal.

(5.) *Ovario-Tubal.*—Here the ovum is attached to the fimbriated extremity of the oviduct, and also to the ovary.

160. **Causes of Extra-Uterine Gestation.**—Many theories have been broached in reference to the causes of this abnormal form of gestation. Astruc held that it was more prevalent among unmarried females and widows than the married, and he said that it was owing to fright—fear of being detected in the act—that the embryo got into the wrong place. This will not stand the test. Experience has shown that as many have occurred amongst the married as the unmarried. Virchow propounded a more plausible theory. He noticed that this form of pregnancy was often accompanied by adhesions of internal genital organs, produced by false membranes. The adhesions, too, were most frequently on the left side. He thought, then, that these adhesions interfered with the mobility of the ovary, and thus the misplacement arose. Stricture, or even an imperforate condition of the Fallopian tube, was also supposed to be a cause. Inflammation of the mucous membrane of the tube, or impaired peristaltic action, or disproportion between the ovum and oviduct, may also have to do with it. The interstitial variety has been attributed (in addition to Breschet's view) to abnormally large interspaces between the uterine fibres, or to a partially cornuated uterus. In abdominal pregnancy the cause might be due to an imperfect action of the oviduct. It should be borne in mind here that spermatozoa travel not only to the ovaries, but invade the entire pelvic portion of the abdominal cavity.

161. **Symptoms of Extra-uterine Pregnancy.**—The symptoms of extra-uterine fœtation are certainly not uniform. This might be expected, for they will depend much on the particular site where the embryo is placed. In some cases there is not much suffering to begin with; but, in others, there is intense distress from the outset. Menstruation may or may not be suspended. The mammæ generally enlarge, as in normal gestation, and the characteristic areola and mammilla are developed. There is often a sense of weight and great uneasiness in the abdomen, or deeply seated in the pelvis. Nausea and vomiting, too, are common. An enlargement of the abdomen takes place usually at a particular spot, and this part is often the seat of pain. The uterus increases to a certain extent, but there are not those changes which take place when a normal pregnancy is in progress. For example, the cervix does not diminish in length, nor does it point toward the sacrum, as it commonly does in natural cases. But the decidua is formed. By grasping the uterus with one hand external, and the other internal, we will find that the abdominal swelling is not the enlarged womb. We will thus make out that, *qua* the uterus, the tumor is *extra*, and not *intra*. The limbs of the fœtus may sometimes be readily felt. If the child continues to live, movement will be felt, and it will be all at one side; the movements, too, will occasion much pain. Sometimes the uterus expels masses of fleshy-

looking substance resembling moles, or like portions of placenta. Wherever this latter is implanted, there is greatly increased vascular action, and, in some cases, fatal hemorrhage has occurred from the rupture of the vessels.

162. **Progress of the Case.**—The fœtus and its appendages at first develop much the same as if they had been located in their natural bed, but the lobes of the placenta have been found more abundant. The embryo is enveloped in a cyst, which differs as the site varies, just as the material of which a dwelling is built differs in different parts of a country, owing to the nature of the strata in its locality, In "ovarian" it is constituted by the fibrous and other tissues of the ovary itself; in "tubal," it is made up of the materials of the oviduct; and in "ventral," it consists of a plastic exudation thrown out to meet the abnormal circumstance. In "ovarian" and "Fallopian" cases the placenta is thin, as might be looked for in such a tight-bound place. Nothing is more truly wonderful than the efforts made by nature in such cases to atone for her blunder; but too often, unfortunately, she fails to avert the dangers which, in a nodding moment, she has inaugurated. It is rare to find these cases going on to the full time. They may go to the 5th month or so; occasionally they will go longer—even for years. In such a case the embryo becomes dry and shrivelled, fatty, or calcareous. In the latter case, it is termed lithopœdion. When it goes to the full time, it is yet seldom that the fœtus is alive. It perishes from imperfect nutrition and other causes. In some instances the cyst has given way, and the fœtus has escaped from it; but a new cyst, a secondary one, arises as the product of inflammatory action. In other instances, inflammation and ulceration occur, and a fistulous communication externally results. This opening may be either through the abdominal wall or rectum, the vagina, or bladder. Through this abnormal canal produced by ulceration, the fœtus, in a state of decay, may come, or be extracted piecemeal, and from time to time. The late Dr. Dyce of Aberdeen recorded a case where the fœtus was retained in the abdomen for eight years. The woman bore two children afterward. The late Dr. Campbell reported a collection of 75 cases. The period of retention ranged from 4 months to 56 years. Normal gestation may proceed in presence of extra-uterine fœtation. Nine women were found to have conceived in these circumstances once; and one female actually seven times. Other statistics show that in 98 cases the fœtus perished in 79 at 9 months, or soon after; 1 died in the 8th month, 7 about the 7th month, 1 in the 6th, 2 in the 5th, 2 in the 4th, 5 in the 3rd, and 1 at the end of the 1st month. The most favorable termination is where the embryo dies early, and is encysted in its own membranes; the worst, where the sac gives way, and hemorrhage or inflammation follows.

163. **Dangers.**—This form of pregnancy is likely to tell severely on the mother. A serious source of danger is the rupture of the cyst which may lead to fatal hemorrhage. If the woman escapes this she may succumb to inflammation of the peritoneum. Rupture is usually preceded by a good deal of pain, often with vomiting, feeble pulse, and cold extremities. Sometimes, when the dead mass tries to make its way out, there is extensive suppuration, pain, diarrhœa, and hectic symptoms. At other times, when the fœtus is retained, and the cyst remains unruptured, pains of a severe character, and recurrent like those of labor, set in; and the uterus may sympathize also, and contract with severity; and from more or fewer of these concomitants the female may become ex-

hausted, and finally sink. But, as Dr. Campbell has remarked, the child, after perishing, may remain in the abdomen of the woman for years without causing much inconvenience or pain.

Treatment.—If we have a case of extra-uterine pregnancy to deal with, we know that a rock ahead is the giving way of the cyst; and therefore our aim should be to aid in preserving it entire as long as possible. The unfortunate woman should avoid exertion, and all pressure, or chance of pressure, on the tumor. Anything likely to excite or irritate the uterus, too, such as a strong cathartic, should be shunned. If great uneasiness and pain be present in the tumor, it may be allayed by ice, leeching, and an opiate. If we should find an abscess forming in the abdomen, or vagina, or rectum, resulting, it may be, from the decomposition of the embryo, we may encourage this by fomentations and poultices where practicable; afterward making an opening and affording an outlet for the *débris* of the fœtus. Experience has shown that when suppuration has been set up, there is much less danger to be anticipated from an incision. The embryo has been extracted in this way both from the abdomen and vagina. Out of 30 such cases, 28 were successful.

164.—**Gastrotomy, etc., in Extra-uterine Pregnancy.**—Gastrotomy has been practised with success in this form of pregnancy. It is an operation fraught with risks. We do not mean to affirm that cutting into a woman's abdomen, *per se*, and by a skilled operator, is so dangerous a proceeding as was once imagined (from Hippocrates, who believed it fatal, down to recent times); no, our modern ovariotomists have demonstrated the contrary; but in the cases under consideration there is the cutting into a cyst; the severing of blood-vessels; profuse and critical hemorrhage. On the other hand, when suppuration is set up, this bleeding is avoided. If the fœtus is pressing down on the vagina, and you can feel it bulging, an incision may be made through the vaginal wall, and the embryo extracted either by forceps or version. Dubois did this, and there was a case in the hospital here thus treated by Dr. Duncan a year or two ago. In Dubois' case there were extensive and firm adhesions between the head and the walls of the cyst, and he allowed it to decompose, and then removed it, bit by bit, with the pincers. Dr. Hall Davis reported a case to the Lond. Obst. Soc., Nov. 2, 1870, where the patient died six days after rupture of the cyst. Dr. Davis diagnosed it correctly, and wished to operate, but the other consultants did not sanction the proceeding. Dr. J. B. Hicks performed the operation successfully (see Lancet, July 20, 1867). It was a case where the cyst was in communication with the intestines. The tumor bulged between the umbilicus and the right flank, and he cut down upon the most tender part of it. He incised down to the peritoneum, carefully opened the cyst, and removed the fœtus (which was putrid) by means of the ovum forceps. Some detached ribs were also removed. The placenta being placed deep, and being firmly adherent, was allowed to come away gradually. This occupied five days. The cyst was washed out daily for a fortnight, until all fœtor ceased. At the end of five weeks the walls of the cyst had united, and in a fortnight afterward the wound was healed. There is another condition where recourse might be had to gastrotomy. For example, if the fœtus has gone beyond the full period, and the mother consequently suffers intensely, owing to the presence of the embryo in its unnatural locality—in point of fact, threatens to succumb altogether owing to the dire displacement

—then a resort to the operation may be warranted: it gives a chance of life.

165. **Destruction (artificial) of the life of the Fœtus.**—In order to avert the serious risks inseparable from rupture of the cyst, hemorrhage, and inflammation, it has been proposed to destroy the fœtus before it develops sufficiently to enkindle mischief. About fourteen years ago M. Bachetti of Pisa adopted the method of electro-puncture. He inserted two needles into the sac, and passed through them an electro-magnetic current. This was successful. An objection to this plan may be founded on the difficulty of diagnosing the case; for it may be confounded with various pelvic and abdominal tumors, such as perimetritis, peri-uterine hæmatocele, and ovarian dropsy. Dr. Greenhalgh has suggested that, when the cyst bulges against the roof of the vagina, it should be punctured with a long hair trocar and canula, so that the liquor amnii may be discharged. He thinks that when this is done early the embryo will perish, and the involucra cease to grow. He reports a successful case in the *Lancet*, March 23, 1867. We would suggest that the embryo might possibly be destroyed by internal remedies, such as a course of iodine, ergot, or occasional doses of opium. Of course, we would be scrupulously careful not to injure the mother. The morality of this proceeding may be questioned; but the arguments in favor of craniotomy hold equally well here. We have named ergot, because we believe it kills the child (when given in large doses), both by poisoning it and arresting the utero-placental circulation (that is, in intra-uterine cases).

166. **Missed Labor, and Postponed Parturition.**—In missed labor the parturient forces do not come into play at the normal period, and the fœtus is incarcerated in the uterus beyond the time when its liberation is usually witnessed. As regards the cause of this prolongation of the gravid state, we can only indulge in speculation. If we believed that the fœtus was the excitant of uterine action, then it would be plausible to conclude that some pathological condition of the contained body was the cause; and, on the other hand, if we held that it was due to ovarian influence, we might ascribe it to some morbid condition of the ovaries. Another view we might take would be that it was due to a failure in attaining the culmination of uterine irritability; or, lastly, that it was owing to the arrestment of the ordinary changes in the decidua and placenta, which arrestment in turn would result from the non-maturity of the fœtus. A morbid condition of the contained body seems the most likely cause, for this state also implies arrestment or modification of, or interference with, the other conditions (such as the changes in the decidua, etc., or the due amount of ovarian excitement) which impel unto the parturient act. Dr. Oldham, many years ago, showed the uterus and *débris* of a case of this nature to the Pathological Society of London. Portions of the fœtus continued to be discharged from the uterus for three months after the full period, and at this time the woman died. Dr. Oldham made a *post-mortem* examination, and found in the womb "a moulded mass of bones and adipocerous material." Dr. Halley brought a case before the London Obstetrical Society, where the greater portion of the skeleton of a dead fœtus was removed from the uterus after being four years retained in that organ (*Lancet*, July 20, 1867). In the cow, postponement occasionally happens. It is, however, to be recollected that missed labor is a rare occurrence. Of course, we exclude those instances of unquestionable delay for a month or so, which

ought not to be viewed as similar, but which might simply be termed postponed parturition.

Treatment.—If a case of this nature were met with, we should endeavor to arouse uterine contraction by ergot, by galvanism, by friction over the ovaries, by injections of warm water into the uterus, or by the introduction of tents. It is possible one might have to break up the mass, and remove it through the os uteri, as suggested by Tyler Smith.

CHAPTER X.

SUPERFŒTATION.

167. **Superfœtation.**—This is the name given to those cases where a pregnant woman conceives again during that state—in fact, in the presence of a gravid uterus. It implies not only that there are two children (or even more) within her womb, but that these are of different ages. Among early authors such cases were implicitly believed in, but in modern times doubt has arisen on the subject. It is undeniable, however, that a female may be twice impregnated within a short period. The case mentioned by Buffon is usually cited. A white woman, immediately after connection with her husband, was forced, through fear of her life, to have similar intercourse with a negro. She was afterward delivered of a white child and a mulatto. Dewees, Beck, Dunglison, Dr. Lopez, and others record similar cases. Dr. Henry, in his excellent monograph on the subject, gives striking illustrations. In the lower animals the same thing is found. Mares covered first by a stallion, and soon thereafter by an ass, have given birth at once to a horse and mule.

In all of these cases, however, fecundation occurred only within a short space of time, and, therefore, they hardly support the doctrine of superfœtation; for by it is meant a longer interval between the procreative acts, and the delivery of a fully-developed child, say a month or two after another mature infant had been born. It is in reference to these latter cases that doubt has been entertained by such men as Caspar, Granville, and others. Those who oppose the doctrine do so on the following grounds: They hold that the mucous plug of the cervix uteri, together with the decidual lining of the uterus, would debar the chance of a fresh conception occurring. Of this there is some doubt. Dr. Matthews Duncan and others have shown that there is communication between the vagina and ovary for a considerable time—a few months—after fecundation; and Dr. Tyler Smith has demonstrated that the mucous plug is no great barrier to the ascent of the spermatozoa. Moreover, the latter believes the decidua to be open—that there is a breach in it at the upper termination of the cervix; and Hunter held that there was a similar opening in the decidua, opposite the uterine terminations of the oviducts. Thus the way would be pretty patent, and the explanation of superfœtation not very latent. There are cases, moreover, proving it. One is reported by Eisemann of Strasbourg. A woman was delivered of a second mature child four and a half months after the birth of the first, which was also mature. In this case there was an autopsy, and it was found that the uterus was single. There is another which has occasioned much controversy. In the fourth volume of the Lond. Med. Trans., p. 161, Dr. Maton communicated to the College of Physicians that Mrs. T——, an Italian lady, was delivered of a mature male child at Palermo on the 12th November, 1807, and eighty-two days afterward she brought forth another, perfect and mature. There are other cases reported.

We may state that some of the opponents of superfœtation likewise explain its existence as due either to double uterus, or to retention of a twin after the birth of its contemporary. But we are inclined to agree with those who view this form of pregnancy as possible, although not likely to occur often. This rarity we should not think due so much to mechanical hindrances as to the absence of proper ovules. It would imply extraordinary vigor were perfect ovulation to be achieved for any length of time after impregnation. The latter doubtless inaugurates changes which are incompatible with the former, owing to their appropriation of all the available generative vigor of the female economy.

How soon after Labor may a Woman Conceive?—This question is of a kindred nature to the previous subject. There are numerous instances of conception four weeks after, and some even earlier. But it is highly probable that those earlier cases are exceedingly rare, the lochial discharge interfering with the ascent of the spermatozoa.

CHAPTER XI.

MOLAR PREGNANCY.

168. **Molar Pregnancy—False Moles—Genuine or True Moles.**—Various substances, organized and non-organized, are discharged from the uterus even of the virgin from time to time, such as the membrane in certain cases of dysmenorrhœa, and fibrinous masses, in shape like the cavity of the uterus. These are termed spurious or false moles, and have nothing whatever to do with fecundation. Many of the earlier authors maintained that a mole could not exist without impregnation—that it was always the offspring of intercourse. This was the opinion of Mauriceau, who, in his 105th Aphorism (*Traite des Maladies des Femmes Grosses*), says, "*Les femmes* n'engendrent *jamais* des moles, si elles n'ont usé du coit."

This we cannot subscribe to, believing that cases occur—nay, more, having met with them—where fleshly masses have been expelled from the uterus of women who certainly never had connection. If virgins expel such things, then, they are not to be impeached ; to do so would be unjust.

Genuine Moles.—This class always implies previous fecundation. There are several kinds—the hydatiginous, the fatty, and the carneous.

169. **Hydatiginous variety.**—This kind of mole has been carefully investigated by Robin, Barnes, Mettenheimer, Paget, Hewitt, and others. It is due to a perverted growth of the villi of the chorion. These villi take on abnormal action, and, becoming dropsical, swell out into little bags. These hang upon pedicles, and when a number are grouped together the mass resembles not a little a bunch of grapes. The pedicle

of these dropsical villi is formed of the remains of the base of a villus that has become dropsical. Gooch, the well-known author of an excellent book on female diseases, compared the little bags to currants, while Cruveilhier likened them to grapes. The specimens we have met with resemble the latter—they were just like very small grapes. Mettenheimer thinks that on the outer surface of the little cysts, formed by the transformation of the cells of the villi, a new growth of villi arises, and that these again are morbidly altered into similar cysts, and so on. Dr. Graily Hewitt (Lond. Obstet. Soc. Trans., vol. i., p. 249) says there is no new formation at all. As regards the cause of the degeneration of the ovum and the perverted growth of the villi, that is obscure. It may be some innate morbid condition of the ovum, or some acquired defect. Dr. Hewitt thinks that the starting-point of the abnormality is the death of the fœtus, rather than that this latter is the result of the degeneration.

Carneous Mole.—This mole is formed in the following way: Blood is effused in the early weeks of pregnancy between the membranes, or into the substance of the chorion, probably owing to disease, and the ovum undergoes an alteration. The nourishment of the membranes is interfered with, and their normal development is arrested. The blood becomes partly organized, and of a pale color, and the membranes get dense. The fœtus atrophies or disappears altogether. When this mole is expelled, which happens at no certain date, we see the dense and thickened membranes, and either a shrivelled embryo or none at all.

170. *Fatty Mole.*—After the placenta has been formed, it may become morbidly affected, and thus unfitted for the purpose of fœtal nutrition; or, on the other hand, the fœtus may perish, and yet the placenta remain on its site, and continue to be nourished more or less. The embryo will in either case get shrunken up. What comes away may be a pretty large mass of fatty placenta, and a very small and withered fœtus. All these three varieties of mole are due to an interference with the process of healthy nutrition. Whether the starting-point be fœtal or membranous is still an open question. In some cases a fully-developed fœtus will be delivered, with a placenta invaded to a limited extent by this affection.

Period of Expulsion of Moles.—The period of extrusion of moles is controlled by no law. In normal pregnancy the time is definite, but it is not so here. Probably, however, there is a tendency toward their expulsion soon after the death or transformation of the embryo. Some of them are retained for a long period. This may involve medico-legal questions. For example, a woman may be delivered of a mature child, and some months afterward expel a mole, her husband all the while being absent from her. Or a widow may also be delivered of a mole a long time after her husband's decease. Suspicions of unfaithfulness may thus arise—strife, hatred, and estrangement become engendered; but it is in the physician's power to calm the storm, and replace discord by peace. To this end, it is necessary to be conversant with the characters of these degenerate ova. Some of the old authors drew fanciful pictures of these moles, which were made to bear a resemblance to various animals, such as monkeys and mice, lizards, frogs, owls, etc.; but although the shape of them is sometimes rather odd, there was in such illustrations no little drawing on the imagination.

171. **Symptoms of Molar Pregnancy.**—The symptoms vary a good deal, according to the kind. Some women never suspected they were carrying a mole until they expelled it. As regards the hydatiginous, which is the most important, the symptoms are well marked and often

severe. The growth develops rapidly, and the abdomen enlarges much sooner than in a normal pregnancy, being perhaps as large at six months as it should be at the end of pregnancy. It is not only prematurely large, but also abnormal in its outlines. This form of degeneration bulges out at the sides, or has a very irregular contour. There is, moreover, no movement, as would be experienced in normal cases, "no quickening," no fœtal flinging against the mother's belly. This indeed astonishes the woman, and she will sometimes say, "Doctor, I am getting very large, larger than I was wont to do, and yet I have never 'quickened;' I have never felt the child stirring within me. I hope nothing is wrong." Further, there is the absence of the auscultatory phenomena. There are no cardiac sounds, and no uterine souffle. But, above all, mark another and most valuable sign, one eclipsing all the others—in fact, pathognomonic of the degeneration under notice—viz., a discharge from the uterus of water and blood, resembling red-currant juice, together, perhaps, with clusters of the hydatids themselves. If any doubt existed before, it would now be replaced by certainty, for seeing is believing. This marks the abnormality as light indicates the sun—it is the degeneration itself. Blood and water, of course, come away in cauliflower excrescence, etc., but the little bunches of grapes are the things that settle the diagnosis. As the hemorrhage is often very profuse, more so, in fact, than in some cases of placenta prævia, the woman may get into rather bad health—suffer, in short, from the consequences of abundant depletion—anæmia, feeble cardiac action, or dropsy. The unfortunate thing, too, is that the discharge may go on to a great extent before the uterus is got emptied. Masses of the hydatids may come away, but more remain, the consistence and texture of it being such that the uterus cannot grasp it and expel it, as it would a fœtus. Portions are thus left behind, forming the nuclei of fresh abnormal growth, and the source of renewed flooding.

In the other varieties of mole there is no such bulky growth, and therefore no such enlarged abdomen. The signs of pregnancy may be set up for a while, but they recede and disappear. There is no fœtal movement, and no sounds of fœtal cardiac action. Hemorrhage may set in, or discharges of an offensive nature, attended by painful and irregular uterine action. Debility, gastric irritation, and general malaise also occur.

Extra-Uterine Moles.—These have been met with in the ovary and abdomen, and the cyst has given way and caused death. Sometimes it has opened into the bladder, at other times into the bowel.

172. **Treatment.**—If we meet with a case of "Gooch's currants," of this hydatiginous degeneration, and if it is threatening to deplete the woman to the gates of death, we will endeavor to get the uterus evacuated as early as we can. It is common to recommend oxytoxics, such as Cannabis indica, borax, or ergot, the latter always being preferred, from its great power over the uterus. It may fail to insure the expulsion of the mass, in which case it will have to be scooped out with the hand. This implies a dilated or dilatable os, and it will be fortunate if we meet with this. In the only case we have met with this plan was successful, although the hydatids at some points of the uterine wall adhered almost as firmly as a placenta glued by fibrinous deposit. Even after evacuating the uterus there may be a good deal of hemorrhage. If so, repeat the ergot, use abdominal pressure, and give iced drinks. When the female is convalescent, begin a course of iron, bromide of potassium, and nux vomica. Nutritious food and some good wine are also necessary.

173. **Diseases of the Fœtus.**—The fœtus is subject to many maladies, which not only compromise its existence, but modify the character of the labor, and lead often to premature parturition. Some of these intra-uterine diseases are acquired from the mother; others are transmitted by the male parent. Syphilis is a somewhat common affection, and may be communicated by the mother, or by the father through the fecundating liquor. The other diseases which have been met with are small-pox, measles, erythema, erysipelas, pemphigus, pleurisy, pneumonia, pulmonary abscess, jaundice, dropsy, calculus, rickets, cancer, caries, and necrosis. Inflammation, not only of the surface of the body, but of the deeper parts, is also quite common. We have met with a good many cases of hydrocephalus, due to inflammation of the arachnoid. The child frequently comes into the world alive, despite one or other of these diseases; but at other times the vital spark is destroyed. Life, we may repeat here also, may be sacrificed owing to placental disease.

Death of Fœtus—Signs of.—The question whether the child is alive or dead is one of profound importance often to the obstetrician. For instance, if we had a deformed pelvis to deal with, or any other obstruction, rendering it impossible for the child to come away naturally, we might at once perform cephalotripsy, and thus save the mother the danger of delay, as well as the risks inseparable from dragging an unreduced head through the pelvis. It is sometimes not easy to diagnose a dead fœtus. The following are the principal symptoms and signs:

174. (1.) Cessation of fœtal movement. (2.) Sense of coldness or of a dull weight in the uterus. (3.) Diminution in the size of the abdomen, which also becomes flaccid. (4.) A sinking backward of the umbilicus. (5.) Diminished firmness of the mammæ, and suppression of the mammary fluid. (6.) Rigors. (7.) Languor, and a sunken expression of countenance. (8.) Dull dark-brown ring around the eyes. (9.) Absence of the fœtal cardiac sounds. (10.) Absence of funic souffle. (11.) Emphysema of the scalp. (12.) Peeling off of cuticle. (13.) Cranial bones feeling very loose within the scalp, and overlapping too much and too easily. (14.) When it is a face presentation (such being, however, rare) the lips are flabby and do not grasp the finger, and the movements of the tongue cease. (15.) Evacuation of dark-colored, offensive, and putrid discharge. (16.) Discharge of meconium. (This, in a breech case, where the child is alive, often comes away.)

Relative importance of the various Signs.—As regards the relative importance of these various indications, much stress should be laid on the absence of the cardiac sounds and the funic bruit; as also on the looseness of the cranial bones, which one may push about freely within the scalp; and the desquamation of the cuticle. But then we have to remember that, even when the child is alive, we may fail to detect the cardiac sounds; moreover, the funis ceasing to pulsate may belong to another child—in fact, it may be a case of twins, one dead and the other living, and the cord one holds between the fingers may belong to the dead child. In some instances, too, where the child is feeble, the cranial bones permit of a good deal of overlapping.

On the whole, however, if we have cessation of the lively movements of the child for some time; absence of cardiac and funic sounds; abnormal looseness of the cranial bones; emphysema of scalp; desquamation of the cuticle; and recession of abdomen and umbilicus, it will be a singular thing if, in such a case, we witness a living child brought forth.

Dr. James Sidey showed to the Ed. Obstet. Society, a child with the cuticle peeling off extensively, and which yet lived about ten minutes after birth. Other cases have been met with of a similar kind.

CHAPTER XII.

PREMATURE LABOR.

175. **Abortion; Premature Labor.**—We now arrive at labor, though not normal parturition, but that accident of the gravid state which consists of the premature expulsion or dropping of the ovum. It is a very common mishap, and is worthy of careful attention, not alone on account of the great destruction of fœtal life which it occasions, but also owing to the evils which it frequently entails on the woman.

When the female parts with the ovum prior to the sixth month, it is termed an abortion or miscarriage; after this period, a premature labor. This was Denman's arrangement. Various statistics are given to show the frequency of abortion. Of Dr. Whitehead's group of 2000 women, 1 in 7 had aborted. Of 747, all had aborted once at least, some oftener. As to the pregnancy most likely to go wrong, out of 226 women pregnant for the second time, 20 had aborted of the first; and of 230 pregnant for the third time, 58 had aborted previously. Of 602 cases, abortion occurred at the following periods: In 35, at 2 months; in 275, at 3 months; in 147, at 4 months; in 30, at 5 months; in 32, at 6 months; in 55, at 7 months; in 28, at 8 months.

Abortion is thus most likely to occur at the third month. Then it is most liable to happen during a first case, and in some of the later pregnancies, just as the mortality is greatest then.

Relative frequency in different classes and stations of life.—Abortion is more common among the higher classes than those in a humbler sphere. This is owing, in all likelihood, to the greater sensitiveness and excitability of the nervous system, due to luxury, refinement, or an indolent and inactive life. The proportion would probably be all the greater, too, but for the fact that abortions are often occasioned in women in humble station from various accidents common to their occupation, or to the severe physical labor of their lot. Among uncivilized peoples, unless accidents were interposing, the premature expulsion of the ovum would probably be rare.

176. **Causes of Abortion.**—The causes of abortion have been divided into two classes; those belonging to the mother, or the maternal; and those pertaining to the ovum—the fœtal or ovuline.

Among the maternal, notice first those due to reflex movement.

(1.) *Reflex Causes.*—The woman is often the prey of numerous causes of irritation sufficient to excite premature action of the muscular fibres of the uterus, and the extrusion of the ovum; for example, various affections of the contiguous part, the rectum, such as hemorrhoids, cancer, fissure, tenesmus from dysentery, or the tormina of a drastic cathartic. Then worms located in it, and indurated fæces, may supply irritation sufficient to arouse antedated expulsive uterine action. Stone in the bladder, strangury from cantharides or cold, or the irritation of the catheter, may likewise be enough. Lactation is another reflex cause of abortion. We have known females frequently prolong the nursing period in order, as they thought, to prevent conception ; but they often conceived notwithstanding. They are frequently not aware of it either, until that same lactation, which they fondly imagined was an effectual preventive of pregnancy, reflexly brought the ovum prematurely away. They will say to you, " Doctor, I did not dream I was in that way." We find, after delivery, that the application of the infant to the breast occasions uterine contraction and pain—an instance of reflex action. We take advantage of this where there is a tendency to flooding, and with good results. On the same principle, Scanzoni recommended suction of the breasts for the purpose of inducing premature labor. As was said before, however, the system probably requires all its available strength to enable it to produce proper ovules ; and any great drain, such as lactation, may retard their formation in many cases. The pain and shock of tooth extraction has also reflexly occasioned abortion. Morbid states of the uterus itself induce it, such as congestion and hypertrophy ; ulceration of the os and cervix, induration, malignant disease, fibrous tumors, polypi, and flexions. These flexions cause hemorrhage in the decidua, which irritates the muscular fibres of the uterus, and induces contraction. Other causes may be enumerated, such as irritation of the vagina from syphilis, leucorrhœa, or excessive connection; ovarian disease; irritation of the womb itself from the presence of a diseased or dead fœtus; gastric irritation, chronic vomiting, coughing, and sneezing. A very common and important cause is in the disintegration of the decidua, due in some cases to syphilis, in others to scrofula and debility, or lead-poisoning.

177. (2.) **Centric Causes of Abortion.**—There are various constitutional states which tend to induce abortion. Women who have lost much blood, either directly from the vascular system, or who have become anæmic from different morbid causes, such as disease of the more important glands and viscera, are well known to be prone to miscarriage. Sir Charles Bell thought that this was owing to a deficient supply of blood in the spinal cord ; but Dr. Brown-Séquard has demonstrated that it is due to a preponderance of carbonic acid in the blood, which acid becomes an excitant of the cord. It is not an anæmia of the cord, then, but a toxæmia. The respiratory movements are less efficient in the anæmic state, and hence the increase of the carbonic acid. Disease or injury of the spine may also lead to abortion. Other sources of toxæmia, and consequent abortion, are scarlatina, small-pox, fever, visceral inflammation, albuminuria, and syphilis. Ergot and borax are medicines which operate centrically. They are absorbed into the blood, and act on the lower part of the cord.

Lead-Poisoning as a cause of Abortion.—Abortion has been brought about by the mother's system being impregnated with lead, the embryo thus being killed. There is reason to believe that, when the father suffers from lead-poisoning, the spermatozoa are permeated and rendered unhealthy. This subject offers a tempting field for investigation.

178. **Ovuline Causes of Abortion.**—These are, death of the child, or disease setting up irritation of the uterus, morbid states of the amnion and chorion, or of the placenta. That condition of the placenta, fatty degeneration, which we have already noticed, and which by many is viewed as a natural process, is an exceedingly prevalent cause. In a

large number of my own cases I have found the placenta and membranes showing signs of inflammatory action.

Special Causes.—Various accidents and particular agents are here included—falls, blows, over-exertion, jumping, riding, lifting heavy loads. Emotion, whether excessive joy, grief, or rage, may also be named; and it has been found that females, from the sorrows of captivity and the apprehension of death, as well as martyred females at the stake, have parted prematurely with the embryo. Various drugs and agents, such as ergot, borax, savin, cantharides, croton oil, aloes, gamboge, and galvanism, excite abortion, some reflexly, others centrically.

179. **Habit of Abortion.**—Females acquire a habit of abortion, *so* many authors allege. Undoubtedly there are females who have aborted from 12 to 20 times consecutively, and often at the same period, and most practitioners of experience have met with such; but the question occurs, Is this really habit, or purely a necessity? May it not be due to changes in the structure of the uterus or of the placenta, to flexions, or to adhesions, or to one or other of the many causes afore-named. In the case of those who abort repeatedly, at the same time at least, this would seem a plausible view to take. Habit, however, is often a powerful tyrant, and it may play a part here distinct from any particular morbid, maternal, or ovuline state. It has been observed that many of those who are so very prone to part with the ovum prematurely are also equally prone to conceive. No sooner is one embyro extruded, than a new one from the ovary is protruded. In this extreme readiness, have we not an explanation of the abortion? Can the woman yield in so short a space of time, ovules mature enough to last? Do they not, even before leaving the ovary, contain the elements (unseen, of course) of their own premature decay? While some women will abort regularly, even though the greatest care is taken to secure rest, etc., others can hardly be made to part with the embryo by any amount of adverse conditions, short of direct intrauterine interference. The retentive power of some is commensurate with the incontinence of others. Females of this stamp have beaten and tossed about, have fallen from giddy heights, etc., and yet retained the ovum to the end. Mauriceau mentions the case of a female who fell from the window of a house, and received fractures, bruises, etc., without aborting. I had a case where the lady fell from a height, bruising her side, stunning her back, and dislocating her shoulder, and yet retaining the child; she was in the 6th month. Dupuytren relates an instance where a pregnant female, who had traumatic tetanus, but did not abort. In such cases the ovum and its *nidus* are, in all likelihood, in a healthy state. Of course, in the case of such accidents, the uterus and its contents and appendages would receive no direct injury.

180. **Symptoms and Diagnosis of Abortion.**—The chief indications are pain and hemorrhage. The pain is generally in the back, lumbar, or coxal, of a dull, aching character, extending round to the hypogastrium, and down to the thighs. It recurs at longer or shorter intervals, and increases in frequency and strength. There may be more or less of gastric irritation (sympathetic) and vomiting. Rigors, irritation of the rectum and bladder, with incontinence of urine, are of frequent occurrence. If called to a case where such signs and symptoms were present, we would require to make an examination. We propose that to the woman in a grave, gentle, and yet firm manner, and her consent is usually granted. The finger should be passed very gently up to the os, and if it is a little open, and bedewed with blood, and a portion of the

ovum can be felt, then the case is made out. Very often when one arrives, one finds that a portion, or even the whole, of the ovum has been thrown off; in multitudes of instances we have found it coming away in bits, possessing the fragility of a disintegration of some standing. If we do not see the whole ovum, or any part of it, amongst the discharge, nor feel it by pushing the point of the finger within the os when that is practicable, we may be puzzled as to whether we have an abortion to deal with or not. Both the pain and the blood may indicate something else: polypus, for instance, or malignant disease. The latter cannot mislead us often, for it is usual to find it embracing the os and cervix, which are within our touch. We might, further, if we detected no ovum, be in some doubt whether it was not one of those cases of menstruation during pregnancy which occasionally occur during the first month or two, or even a case of menorrhagia unconnected with the gravid state. In the former instance, we will bear in mind that in menstruation the pain precedes the flooding, and ceases or is subdued on its appearance, and the os is not generally so soft or dilatable.

181. **Treatment.**—The management of abortions should be well mastered by the obstetric student, for they often entail permanent evil on the woman—debility, uterine dislocation, etc. Skill and attention will conserve much to her, besides occasionally also arresting an impending extrusion of the ovum. There are two lines of treatment which may be adopted, depending on the signs and the symptoms present. In the one case, we seek to have the ovum retained; in the other, we endeavor to have it thoroughly expelled. The former might be termed the fœtal-conservative treatment, the latter, the fœtal-expulsive. Under what circumstances would we be warranted in adopting fœtal-conservative means? We will first answer the question in a negative way. Pain—the characteristic pain of uterine contraction—would not debar us from employing such, nor would hemorrhage, unless pretty copious and persistent. The reason of this is, that both such pain and such sanguineous discharge exist in those instances of menstruation during pregnancy, and are therefore compatible with the retention of the embryo. But, on the other hand, if the os be open so as to admit the point of the finger: if part of the ovum can be felt protruding, in addition to recurrent pain and hemorrhage, there would be less hope of success from the adoption of such means. The likelihood, moreover, of fœtal-conservative measures not succeeding would be much enhanced—nay, we should rather say there would be the certainty of failure—if unmistakable bits of ovum were met with in the discharge; then, indeed, would abortion have been satisfactorily evidenced, provided, that is to say, that pregnancy had existed. There is another consideration that would serve to shape our line of treatment. We would inquire if the woman were by habit and repute an *aborter*. If she were in the habit of prematurely parting with the embryo, then we would hope less from such measures at least. On the other hand, there are opposite considerations, such as whether the female was very plethoric, or had suffered from physical injury, or mental perturbation and unrest, sorrow, grief or anger. In such cases the threatening abortion might be counteracted and stayed. To sum up, then; if there were only a little discharge and pain, we would try to avert the miscarriage; if much of both, with open os, and separated and protruding ovum, or, further still, part of the ovum away, we would adopt all necessary means to secure the complete evacuation of the uterine cavity.

182. **Fœtal-Conservative Measures.**—The means whereby a threatened abortion may be arrested are various. Opium claims a prominent notice. It is a drug with a brilliant reputation in peritonitis; so is it here. There it gives rest to the bowel; here it secures repose to the womb. It lays an arrestment on the uterine contractions, and thus may lead to the retention of the ovum. If opium, that is to say, with the uterine quietude that it brings, does not achieve this result, then there is not much hope. If it fails, it is because there exists too extensive a severance of the ovuline and the uterine parts; and its failure we always view as evidencing this—as showing that the miscarriage is inevitable. There is no specific for averting abortion; of all means, uterine rest is the very best. Further, in addition to this, rest of body is of paramount importance. The necessity of this is self-evident. The recumbent posture, with the hips elevated, is most suitable. Again, it will readily appear that anything likely to increase the general circulation should be avoided, and also that anything likely to slow the same might with advantage be adopted. The avoidance of hot drinks, stimulants, mental excitement, etc., on the one hand, and, on the other, the administration of iced or acidulated drinks, will help in these directions. A little blood has been drawn from the plethoric; but one rarely meets now-a-days with the people likely to stand it—those huge creatures of a former age, with blood-vessels over-gorged and ready to burst, who had to make an annual pilgrimage to the village barber for relief. At least in the large cities they are rare. In some cases where the uterus is very much congested, a little local depletion—leeches to the inside of the thighs, or on the perinæum—is useful. Various astringents are recommended. They are useful adjuvants; but if the abortion goes on, they will not do very much good until the uterus is evacuated. The most reliable are—Gallic and Tannic acid, Cannabis indica, Liquor. Ferri Pernit, and ice. This latter is very useful. I give twenty-grain doses of the Gallic acid every four hours in iced water. Bits of lint dipped in iced water may also be inserted into the vagina. The vagina must not be packed, because then it might set up irritation and reflex contraction, and thus thwart conservative measures. Its evil then would exceed its good. If the hemorrhage were very profuse, and continuing for a considerable time, and the os uteri remaining hard, and contracted to such an extent that the point of the finger could not enter, the tampon might have to be used. Sponge, or lint, or the air-pessary, are employed. These stem the flow and stimulate the uterus to renewed expulsive efforts.

183. **Fœtal-Expulsive Treatment.**—When we have made up our minds that we are dealing with a case where the ovum cannot be retained, we should do all in our power to get it away. The retention of it, in whole or part, after its separation from the uterine wall, means bleeding, and bleeding implies the enfeebling, if not the imperilling, of the woman. If the os is dilated enough, we try to hook it away with the finger. This is the safest scoop, and it is often successful. If we cannot get the finger in, we can have recourse to a sponge or tangle tent. This is introduced into the os, and in a few hours it swells and dilates it so that easy entrance is effected. Often that entrance is rendered unnecessary, because the tent both opens the door of the uterus wide enough to admit of the exit of the ovum, and rouses the *vis a tergo*—the expulsive uterine efforts. You remove the tent (6 to 10 hours is long enough to have it in), and at its heels, if we may so speak, comes also the ovum. If it should not so arrive, you use the finger, as before said. But sup-

posing part or whole still remains, and that you cannot remove it with the finger, what is to be done? Resort to ergot. One cannot laud this drug too loudly here. It is *the* great medicine for exciting uterine contraction. As opium is invaluable where you expect to retain the ovum, so ergot is not less so where you wish its expulsion. The one secures repose, the other stimulates to action. It will seldom fail to expel the embryo, if there is anything like an open door, and if there is not, why, get it by means of the tent. There are abortion forceps for removing the ovum. We have never required to use them, finding the finger, tent, and ergot, one or other of them, equal to all the more difficult cases we have met with. With the forceps, or the wire crotchet of Dewees, one might readily injure the womb. Other uterine stimulants of less power than the ergot are borax, Cannab. ind., and galvanism. Drastic cathartics act by contiguous sympathy. The most annoying cases, perhaps, are those (and they are very common) where the ovum is broken down, and comes away bit by bit. Sometimes the fœtus will tumble out, leaving the membranes; at other times these will come away in separate rags, or pieces of decidua will worm out; or the fœtus will be left behind. The placenta often lags and gives trouble. We have known an unsuspected bit lurk long after the rest. Here the question occurs, Is there much risk in leaving a fragment or two behind—risk of bleeding, of irritation, of inflammation even? We will find wonderful differences in regard to this. We have known bits retained for weeks without provoking much bleeding or irritation; in other cases the smallest bit seemed to occasion both. Dr. J. B. Walker exhibited to the Lond. Obstet. Society, Nov. 26, 1870, a placenta that had been retained *in utero* for two months without occasioning hemorrhage, or even fetid discharge. The blighted ovum has been retained *in utero* for a long period in some cases; and portions of the secundines, too, attached to the uterus, without causing active symptoms, although there may be some ill-health experienced. When there is much fetor from straggling and decomposing *débris*, some solution of Permang. potass. may be thrown into the vagina, and also carefully into the uterus. Injections help to wash out remanent portions of the ovum also. The dangers attending miscarriage are chiefly from the loss of blood. Some women lose a great deal, and get blanched and anæmic. Here abundance of stimulants are requisite—wine, brandy, ext. meat, Aromat. Spt. Ammon., etc,; afterward, chalybeates. Convulsions may happen, too, and even prove fatal. Another appalling disorder sometimes sets in (one, too, exceeding rare where the labor is at the full time), viz., tetanus.

184. **Prevention of Abortion.**—If we meet with cases where abortion is due to disease of the placenta—fatty degeneration—we will give the chlorate of potass, or some of the alkaline salts in succession; if to syphilis, we will combat this disease with the potass. iodid. In strumous cases, alter the system by means of ol. morrhuæ, and brace it by chalybeates and change of air. Rest and avoidance of all excitement should be enjoined at the usual period, and at the particular month (which in some women might be termed the abortive one) scrupulously so. Some good may also be done by the use of deobstruant pessaries (Iodid. plumb. and Iodid. potass.) in the way of reducing uterine hypertrophy, if present. At the same time, the preparations of iodine and bromine may be given internally. Nux vomica may be given contemporaneously with the iron, and change of air and salt-water baths are beneficial. In uterine

hypertrophy and induration, small doses of the Hydrarg. Corrosiv. Sub., with Tinct. Cinchonæ, proves of service.

Can we be certain of the Duration of the Pregnant State from the Appearance of the Ovum?—Not very. We should be careful not to pronounce hastily, for sometimes the fœtus may atrophy or perish, and the membranes continue to grow. The fœtus might thus be of the dimensions of a 3d or 4th month gestation, when the pregnancy was of longer duration. Further, the membranes sometimes get dropsical, and are thus much enlarged, giving the idea of a gestation much more advanced than it really is. Important questions and interests may depend on this, and it behoves one to be cautious. It is only experience (an article, as Carlyle says, that taketh high wages in the getting of it) that can enable us to discriminate and judge aright.

CHAPTER XIII.

STERILITY.

185. **Sterility.**—There are many married women—women, too, apparently healthy and robust—who never conceive, and this barrenness is to them a source of deep and irrepressible regret. One is often consulted by such, and it is important to know the subject well—not only to be able to confer benefit when that is possible, but also to say when that is beyond our power. That it is beyond one's power in many instances is patent enough to the doctor, though much less so to the patient; and we find the latter peregrinating a deal in quest of sterility-mongers, bestowing "fat and flowing fees," and finding in the end the treatment for which they have paid so dearly as thoroughly sterile as themselves. Of course, many cases are curable, and there the doctor plies all his science and skill; others are obscure, and there too he exhausts his curative means; but others are simply beyond human relief (for it is not given to man to provide a new ovary, or oviduct, or womb), and there one ought to hold one's hand. We say this much preliminarily, because the barren line is often fruitful of gold, and there might be a tendency to run, in consequence, into a routine of interference, with the shabby view of becoming an oracle in barrenness. This position might pay pecuniarily, but it is quite conceivable that morally it would be an incalculable loss.

186. **Causes of Sterility.**—Disease of the ovaries, or of the Graafian vesicles, or absence of the ovaries, will occasion sterility. Stricture of the oviducts, or an imperforate condition of the same, or morbid adhesion of the fimbriæ to the ovary, may also produce it. Absence of the uterus, or obliteration of its cavity, or an impervious condition of the os and cervix, are also causes. Diseases of the uterus, such as fibrous tumors, cancer, polypi, may cause sterility, but not necessarily. Pregnancy often co-exists with these. Prolapsus, and versions and flexions of various kinds and degrees, may also thwart impregnation, but not inevitably. Anteflexion, especially by interfering with the passage of the seminal fluid, constriction of the canal of the cervix, closure of the os and of the vaginal canal, imperforate hymen, tumors shutting up the

vagina, vaginismus preventing connection, absence of the vagina itself—all these have occasioned sterility. An elongated condition of the vaginal portion of the cervix leads sometimes to a flexion, which is a bar to the transmission of the semen. Inversion of the uterus, membranous dysmenorrhœa, and leucorrhœa are also the occasion of barrenness. This latter, in numerous instances, is no preventive of impregnation; but in others, partly by chemical action on the spermatozoa, and partly by offering mechanical impediment, it defeats fecundation. This has been ably treated of by Drs. Marion Sims and Tyler Smyth.

Other causes of non-fecundation have their basis in constitutional defects. Syphilis is one of these, and it is probable that, as it often induces abortion by generating placental, or decidual, or fœtal disease, so it may destroy the ovum at a period prior to the time when it sets up cognizable signs or symptoms; nay, even at that pristine period when it is about to be matured, or when the ovule has been penetrated by the spermatozoa.

187. Anæmia is inimical to the production of mature ovules, and therefore favors sterility. Women much burdened with fat also rarely replenish the earth. Those who live on the "fat of the land," who indulge in high feeding, and in habits fitly termed luxurious, have often to mourn the want of issue. If the fertility of the "hewer of wood" is undeniable, not less so is the barrenness of the indolent and the luxurious. Is it the high feeding that retards mature ovulation, or is it the lethargy and inaction? Very likely the latter, for Nature vouchsafes vigor only to those who undergo physical toil. Turkey and champagne, partridge and port, cognac and custards, will not alone induce ovarian debility or ovular imperfection; there must also be the reclining on downy couches, and the shirking of physical labor.

Sexual disinclination betrays sterility in some, but only where it is associated with, or the result of, sexual incompetence. This latter may be due either to excessive indulgence or imperfect development of the generative organs. As many ladies ardently wish for offspring, as before said, so many also are extremely anxious to avoid becoming pregnant. We have heard it said that in America various devices are resorted to to render fecundation impossible. Among these are the use of various injections after connection. Coste discovered, by experiment, that the spermatozoa are injured by very cold water; so the injection of this may help to defeat impregnation. Injections further tend to counteract it, by washing away the mucus of the passages, which mucus furthers the ascent of the seminal fluid; and acid solutions may destroy its fecundating power. Highly alkaline fluids may operate in a similar manner. A curious and mysterious thing connected with this subject is this—that females who have had no children to one man (and that man, too, apparently healthy in all his parts) have been fruitful when allied to another. We may either view this as a proof of sexual incompatibility, or that, meanwhile, some morbid condition has been removed.

There are some deeply interesting points in connection with this subject discussed by Matthews Duncan in his work on "Fecundity, Fertility, Sterility," etc. (Edin., Adam & Charles Black, 1866). He has found that the fecundity of wives is greatest from twenty to twenty-five years of age, after which it gradually diminishes; and it declines with greater rapidity after forty years of age. The student with leisure will read the work with much interest and profit.

Diagnosis.—When inquiring into a particular case, it is better to begin by ascertaining the state of the catamenial function, and the constitution and history of the patient. The external generative organs and vagina might then be examined, and afterward the uterus.

188. **Treatment.**—This varies as the causes. If there is debility, anæmia, hydræmia, these must be met by tonics, chalybeates, and change of air. Morbid states of the ovaries and uterus are often successfully combated by Bromid. Potass., Tinc. Cantharid., deobstruent pessaries, and counter-irritation over the ovarian region. Physical obstacles to the entrance of the spermatozoa—to the contact of the sperm and germ cells—may be removed by operation. Flexions may be cautiously overcome, and a constricted os and cervix cautiously dilated; while polypi and fibrous tumors must also be removed. But flexions are not always incompatible with fecundity; and we should be careful about employing operative interference without due consideration. Dr. Robert Lee, whose vast experience constitutes him an authority, deprecates dilatation of the os, and other operative measures, for sterility. He says that he has not only seen the operation often fruitless, but even positively injurious. In addition to inflammation, he says he has seen mania follow. On the other hand, however, there are high authorities, such as Marion Sims and others, who testify to the safety of operative procedure, and the benefits which flow from it. Sims has had a most extended experience in both hemispheres, and is a gentleman of great ingenuity, resource and dexterity. He has certainly proved the harmlessness of incising the os and cervix (that is, when properly done); and, therefore, if the infecundity is due to any obstacle here, there can be little objection to giving this method a trial. Dr. West, in his excellent work, has shown (Dis. of Wom., third ed., p. 252) that polypi, due to enlargement of the Nabothian glands, contribute to sterility by exciting profuse leucorrhœa. Where these have been excised, fertility has taken the place of barrenness. Fibrous tumors contribute both to abortion and sterility, and their removal has led to fruitfulness. Again, let us say that many cases are beyond the help of surgery, and that it is often most profitable to patient and doctor to withhold the hysterotome or the bougie. The injection of alkaline solutions has been proposed, in order to neutralize the acrid discharges from the passages in some cases, which are believed to be inimical to spermatozoal efficiency.

CHAPTER XIV.

DURATION OF PREGNANCY, OR LENGTH OF GESTATION.

189. The ordinary term or duration of pregnancy is nine months. By this is meant 40 weeks, or 280 days, which, in fact, is rather over nine calendar months, and embraces ten lunar ones. Harvey held that the normal period was 275 days, and, on the whole, this is probably nearer the truth, the average being rather under the 280 days. There is no little divergence of opinion amongst obstetricians as regards the time, and we are not surprised at it, because in the vast majority of cases it is difficult, if not impossible, to ascertain the period at which conception took place. While, on the one hand, the normal period may be somewhat shortened, so, on the other, it may be not a little prolonged. The

question of the prolongation of the period is of great importance medico-legally, and, as before remarked, has occasioned no little contrariety of view. A good many eminent men believe in the extension of the period for a month at least, such as Velpeau, Harvey, Smellie, Gardien, etc.; and we must say that we join them in this opinion. Numerous practitioners have recorded cases of what we may term postponed parturition. Professor Atlee records several of one year's duration. It is believed that the duration of pregnancy is controlled a good deal by the age of the parents. The younger the parents, the shorter the term, and *vice versa.* We know by our own personal experience that there is truth in this. There are considerable differences as regards duration, without affecting the maturity of the child.

Method of Calculating the Length of Gestation.—The ordinary way of calculating is from ten to fourteen days after the last menstrual period. Perhaps the most likely time for fecundation to be achieved is just on the back of a catamenial period; but we find that it is accomplished at many points of the interval, even to within a day or two of the menstrual flow. Naegelé's rule was this: He took the date of the termination of the last menstrual period—suppose, for example, the 1st of January; from that he went back three months, or to the 1st of October; then he added seven days to this, which brought him to the 8th of October; and he found that, in all likelihood, this latter date was the probable and likely one on which the labor would begin.

Period of Quickening.—Some reckon by the period of quickening, or that time when the woman first feels the gentle but thrilling movement of her offspring. This is supposed to occur at the four and a-half months, and then other four and a-half months are added. No reliance can be placed on this method, for the period of quickening is extremely variable and uncertain. Some women will feel the gentle pat at the end of the fourth month, others at the end of the fifth, while many are even unconscious of any movement long after this latter period, if at all.

190. **Sensations experienced by the Female.**—Another method of computation is that based on certain fecundatory sensations on the part of the mother. It is affirmed that the female, when impregnated—when fecundation takes place—enjoys an enhanced and exquisite degree of pleasure. Coition, apart from impregnation, involves refined delight; but when fecundation is superadded, the sensation of pleasure is immensely increased. Hippocrates thought so, and Van Swieten held the same opinion. There is reason to believe that we cannot place much reliance on this test; for although some females may experience unwonted sensations, others are utterly unconscious of the same, and are often even unaware that they are pregnant until expulsive contractions begin, or, in some cases, until their own offspring is held up before their wondering eyes—at least they often pretend so.

From one Coitus.—Some have based their calculations on a single act of coition. Dr. James Reid collected forty-three cases where it was believed that impregnation was due to one coitus. In some of these labor occurrred at the end of 260 days, in others at the end of 300. The average was 275 days, or just Harvey's period.

We have mentioned above that fecundation may take place at any time between one catamenial flow and another, and may now add that it may be effected even during the time of the menstrual discharge itself. There are some well-authenticated cases where this has happened. Unmarried men and women, wishing to avoid the exposure which pregnancy brings, have limited their copulative acts to the time of the catamenial flow, under the belief that impregnation was then impossible; but they have found, to their surprise, regret, and shame, that detection even lurked in this cunning device.

Dr. Vassily Sutugin of St. Petersburg has suggested in a very able paper (which may be found in the fourth volume of the Transactions of the Edinburgh Obstetrical Society) that the length of gestation may be pretty well ascertained by measurements of the fœtus and gravid uterus during the second period of pregnancy. While commending the paper as one of scientific value, we cannot think (and we wish we had space for the fit arguments) that much light can be thrown on this subject by the means proposed by Sutugin.

Various tables have been given. Schultze's one is worthy of reproduction, as being read with facility. We give it here:

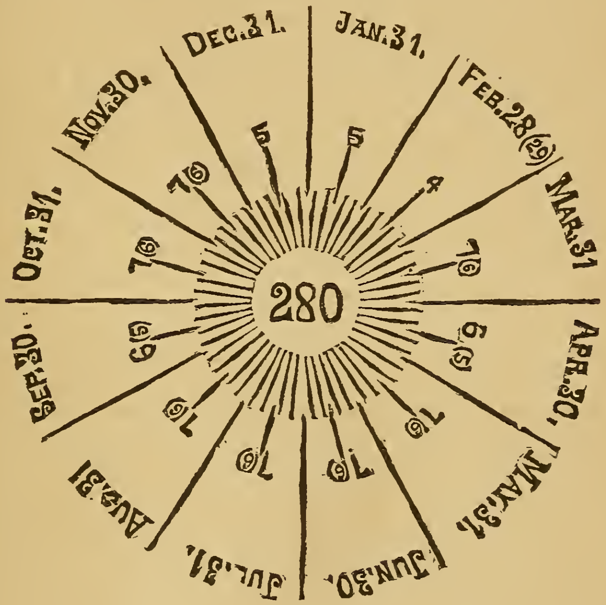

Fig. 11.

To calculate the Duration of Pregnancy. (After Schultze.)

"Around the circle are arranged in their order the months in the year, with the number of days in each. The number placed below each month gives the number of days which must be added to the nine preceding months in order to make up 280 days. If the month of February in a leap year is included in a pregnancy, it is estimated by the number in brackets.

"We reckon, in order to find the next 280 days from the starting-point (the last day of menstruation), nine months forward (or, more simply, three months backward), and add to the date thus reached the number standing below the name of that month.

"*Example* 1.—Last menstruation, the 10th of February; count three months back,=November 10th,+7,=November 17th (in leap year, November 10th,+6,=November 16th).

"*Example* 2.—Last menstruation, 24th March,=29th December,=280 days.

"*Example* 3.—Last menstruation, 30th September, 1863,=July 17th, 1864,=280 days.

"*Example* 4.—Last menstruation, 31st May, 1863,=March 7th, 1864, =280 days.

"The last example shows how to proceed when, at the end of the month, there may be a doubt as to the calculation.

"The 31st of February is equivalent to the 3d of March, which+4= 280 days.

"An equally simple calculation may be made when, in medico-legal investigations, we want to calculate backward from the day of birth to the probable cessation of the menses, 280 days previously. In this case we count three months forward, and *subtract* the number standing under the birth month.

"*Example* 1,—Birth, 31st October,=menses, January 31st−7,=January 24th, or 280 days."

CHAPTER XV.

PARTURITION.

191. **Parturition—Labor.**—Having noticed the initiation, course, and duration, etc., of the pregnant state, we now naturally come to consider its termination, or that interesting period when the ripe fruit falls—when the child and its belongings are expelled from the cavity of the womb. What leads the infant to burst the bars of its prison-house, to escape from the sanctuary where it had dwelt so contentedly for the greater part of a year? Various causes are assigned for this, as we shall see.

Determining Cause of Labor.—Among the ancients there were quaint fancies indulged in regard to this. Avicenna said that "at the appointed time labor comes on by the command of God." Some held that hunger impelled the fœtus to leave the uterus; others, that a desire to pass water or evacuate the bowel prompted it to seek greater liberty. Buffon held that the fœtus was instrumental in emancipating itself, just as the chick breaks its encircling shell at the end of the incubating period. These views will not hold water, for we know that the fœtus is expelled though dead; and, besides, there is the expulsion of the placenta, which possesses no vitality, and has neither, of course, the promptings of appetite or of desire, nor a longing after freedom. Modern opinion points to the uterus and its appendages rather than to the child, and there are several theories on the subject. One is, that labor comes on owing to the antagonism between the muscular fibres of the body and cervix ceasing (Baudelocque). The cervix, by the end of the nine months, is expanded into a circle, and becomes part of the great cavity of the containing body. This view is not a sound or even plausible one; for we often see the uterus expelling its contents when that alleged antagonism ought to subsist to the full, viz., before the cervix has begun to take on increased development at all, as in abortions and premature labors. On the other hand also, in cases where the uterus has been fully developed and shortened, weeks have sometimes elapsed ere the uterine contractions have been inaugurated. A second theory is, that the uterine expulsive efforts are induced by the maturity of the fœtus and its membranes, just as the mellow leaf drops from its stem, and the ripe fruit from its stalk. The late Sir James Simpson thought that labor was due to a change in the structure of the decidua and placenta, and to a separation of these from the inner surface of the uterus, the alteration in the structure of these being due to the maturation of the ovum. His words are: "The loosening or decadence of the membranes and placenta from the interior of the uterus constitutes the determining cause of parturition, and this loosening is itself the result of the effete degeneration of the structure of the decidua toward the full term of pregancy."

192. The opinion of Sir James Simpson is similar to that of Haller, who compared the placenta to the stem of fruit, and reasoned that, as the ripe fruit falls from the tree in consequence of the decay of the stem, so the afterbirth at the end of gestation, separates, and becomes the determining cause of labor. An objection may be urged against this view, viz., that were the placenta to separate to any extent previous to labor, hemorrhage would be the consequence. Schröder says: "The influence of the sympathetic nerve (which, we may remark, is the chief, if not the sole, motor one) is called forth by the irritation which the ovum exerts upon the termination of the nerves on the inner surface of the uterus. By reflex action that irritation is changed into motor activity. Only toward the end of the tenth month this irritation begins to be exerted, because only then, owing to fatty degeneration of the decidua, the ovum becomes a foreign body in the uterus. The fatty degeneration of the peripheral layers of the ovum causes a separation between the ovum and the uterus, which the resulting contractions complete."

193. **Dr. Brown-Sequard,** the distinguished physiologist, holds the following view: "The uterus," says he, "in pregnancy becomes more and more irritable every day; and when its irritability has arrived at a very high degree, then the slight excitation produced by the carbonic acid normally contained in the blood is sufficient to put it in action."

Dr. Tyler Smith has propounded a feasible theory on the subject. According to this author, the determining cause of parturition is due to ovarian excitement. Pregnancy is ruled by the catamenial period, and is explicable on the principal of reflex influence. He says that during the whole period of pregnancy the ovary is liable to a monthly excitement, the period of excitation corresponding to the menstrual one; and he adds that, as a result of this congestion of the ovaries, there is somewhat of a tendency to abortion at each period. He says also that labor comes on at what would have been a catamenial period had the female remained unimpregnated. The ovaries then, according to this view, are the exciting cause. Various objections may be urged against this theory. One formidable one was advanced by Sir James Simpson. He extirpated the ovaries during the latter period of pregnancy, and yet in this case parturition proceeded as usual. Another objection is this: It is not clear that ovulation goes on during gestation; and if not, why should the ovary become excited and congested? Lastly, the duration of pregnancy is not always an exact multiple of the catamenial period.

194. **Classification of Labor.**—Authors have differed a good deal in their manner of classifying labor, some viewing all instances terminated

by the unaided expulsive forces as natural; others limiting the latter to those cases where the head is the presenting part; others again, such as Dr. Rigby, deeming the presentation natural if it comes either by the cephalic or pelvic pole. We prefer reckoning only the cephalic as natural, not only because it is the predominating presentation (out of 327,000 cases, 321,000 were by the head), but also because it insures the easiest and safest labor. In our view, there is no better arrangement than that followed by Churchill and Merriman, and, accordingly, we shall adhere very closely to it. It is as follows:—

CLASS I. Natural Labor.
CLASS II. Unnatural Labor.
CLASS III. Complex or Complicated Labor.

Meaning of the Presenting Part.—The presenting part is that which offers at the pelvic brim. The varieties of presentation are as follows: (1.) Head. (2.) Feet, including knees. (3.) Pelvic, including breech and hips. (4.) Transverse presentations, including arm, shoulder, elbow, hand, back, belly, chest, and sides—the latter being very rare. The diagnosis of these forms will be given under their respective heads.

CHAPTER XVI.

MECHANISM OF PARTURITION.

195. **The Mechanism of Labor.**—The manner in which the fœtus enters, traverses, and leaves, or is expelled from, the passages—forms one of the most important subjects which we have yet had to consider. The right understanding of it is indispensable to safe practice, and ignorance or obliviousness of it is sure to lead to much practical evil. A thoroughly erroneous view was entertained by the older obstetricians in regard to the manner in which the fœtal head passed through the pelvis. They thought that it traversed the pelvic cavity just as it emerged from the same, or with the long diameter antero-posteriorly; and it is somewhat remarkable that this mistaken opinion prevailed so long. However, great discoveries, like precious ore, often lie far from the surface, and, in fact, are dependent on others that have gone before. The credit of calling in question the old erroneous view is due to the Emerald Isle. One hundred and thirty years ago Sir Fielding Oulde of Dublin taught that the face of the child, instead of looking toward the sacrum of the mother, was usually directed to one or other side. This was a step in the right direction; but Oulde further said that the chin of the infant was turned to one or other of its shoulders. Smellie corrected this error regarding the partial rotation of the neck of the child on its body, but agreed in other respects with the Irish knight.

196. Further strides in the direction of truth were made thirty years later by Saxtorph of Copenhagen, and Solayres de Renhac of Montpellier. They found, about the same time, and independently, that the long diameter of the fœtal head entered the pelvis parallel to one of its oblique diameters (in the majority of instances, the right oblique), and not in either the conjugate or transverse one. In this position the occiput was directed towards the left foramen ovale, and the forehead toward the

sacro-iliac symphysis. Baudelocque adopted these views, and advanced them among his pupils. There is still another name to be mentioned with honor in connection with this subject, viz., that of Naegelé of Heidelberg. He published an able essay on the mechanism of parturition in 1818. The German professor watched Nature very narrowly, and was able, while he confirmed correct views, to point out others which were mistaken. For example, Baudelocque and others held that the next most frequent position was with the occiput to the right acetabulum; Naegelé found that it was directed to the right sacro-iliac symphysis. Since the publication of Naegelé's essay, the positions of the fœtal head have been more attended to, and more clearly understood; but, as has been said, his investigations will not bear their proper fruit unless the accoucheur watches as closely as *he* did the manner in which the fœtal head passes through the pelvic cavity. To ascertain this, the finger would require to be frequently applied during the progress of the labor, a proceeding, perhaps, in many cases not easily carried out.

197. **Agents Concerned in Labor.**—In describing the mechanism of labor, a simple plan is to notice the agents concerned separately. There is (1st), the expelling force; (2d), the body to be expelled; (3d), the parts through which this body has to travel.

(1.) *The Expelling Force.*—This embraces two factors; the involuntary, or that of the uterus; and the voluntary or respiratory, viz., the abdominal muscles, and diaphragm, etc. The uterus is the main propelling power; it is capable of effecting the expulsion of the contained body unaided, as is seen in some sad instances where the death of the mother precedes the birth of the child, and in cases where the secondary forces are incapable of action, such as syncope, and asphyxia. In what manner does the uterus expel its contents? It is by the contraction of those muscles which, during the growth of the embryo, had been leaving their embryonic state and developing steadily as the fœtus grew, until, as Kölliker says, their length is increased to about ten times, and their width to about five times. The action of the uterus is in part peristaltic, and in part reflex, the ganglionic system governing the former, and the cerebro-spinal the latter. The muscular fibres are differently arranged. There is a broad layer passing from the round ligaments over the fundus, and these are supposed to draw the uterus down somewhat into the pelvis prior to the commencement of actual labor. There are numerous fibres passing somewhat obliquely round the uterus, and interlacing at all parts; while the more internal layer is disposed, in part, concentrically around the Fallopian tubes, and in part round the body of the womb. By the combined effect of these muscular fibres, the fœtus is squeezed out of the uterus, the os uteri being, during the process, in a state of active dilatation. The contractions begin at the fundus, and stretch, wave-like, down to the cervix, then return again to the fundus. The fibres in contracting twist, and it is probable that, during a pain, the whole uterus assumes a somewhat spiral form, thus closing tightly on the contained body and its appurtenances, and furthering its expulsion. Some authors say that the contractions begin in the cervix, and they point, in proof of this, to the recession of the head, which occurs at the beginning of the pain. But this is caused by the reaction on the head of the liquor amnii. This fluid is first forced downward; but in obedience to hydrostatic law, it presses equally in all directions, and thus, in part, presses up the head. During the second stage the voluntary forces come in and assist in the work of propulsion. The value of these secondary forces is often very great. One can demonstrate this by telling the woman to cough, or by exciting sneezing during the third stage, when an unwilling placenta is often thereby expelled. We see it also in the bearing-down efforts of the second stage.

198. **Uterine Contractions, or Pains.**—The uterine contractions, which are commonly termed "pains" (owing to the fact that they are the occcasion of excessive pain), are marked by various peculiarities. They are periodical, and at first there is a long interval between them; but as labor advances this interval is diminished, and, at the same time, the pains increase as regards suffering and strength. The early pains are of a sharp, cutting character; those of the second stage are less acute, though not less severe, and are called "bearing-down pains." The first pains begin in the loins, and extend round to the abdomen, and down the thighs. Their duration and frequency has been noted in particular cases; but instead of giving a table of a certain instance, we shall simply indicate their general character. At first there may be half-an-hour between each; then by-and-by, 25, 20, or 15 minutes, then 10, 6, 5, 4, 3, and down to two, or even one minute, when the labor is about to terminate. Note particularly, that as the interval diminishes the duration of the pains increases. Their duration and intensity both seem to keep pace with their frequency. As they come oftener, the longer they remain; and the longer their duration the greater the pain.

What is the source and the explanation of this pain?

Source of the Suffering in Labor.—The suffering is not synchronous with the contraction, but is the result of it. It is toward the end of the contraction that the agony is felt. Pressure on the nervous filaments, owing to the contraction of the uterine fibres, together with the dilatation of the uterus and passages, seem to be the cause of the suffering. Women will cry out beforehand that a pain is coming upon them, and doubtless it is the beginning of the uterine contractions that warns them of its dread approach.

199. **Difficulty and Pain of Human Labor.**—It has often been alleged, that Nature is, or ought to be, equal to the task of parturition unaided, just as is the case with the lower animals and the black races of mankind. Moreover, it is added that the function is strictly physiological. As regards the lower animals, comparative anatomy explains readily the facility with which they are delivered. In birds and saurian reptiles the pelvis is simply a more or less complete bony ring, permitting of the easy transmission of the oblong egg. In quadrupeds there is a single straight canal; the axes are nearly on the same plane, and the ligaments binding the pelvis become relaxed. The cetacean pelvis is merely two osseous plates united by ligaments. In the human pelvis, on the contrary, we meet with a bent and tortuous canal, so that the fœtal head, before it can make its escape, has to turn to various points of the compass. Then the fœtal head is of large size, and oval, and peculiarly fixed to the spine. The ligaments and muscles of the human pelvis are much more rigid than in the lower animals, because man, being erect, and the pelvis therefore supporting the trunk, it requires more powerful support to enable it to resist the downward pressure of the abdominal viscera, etc. The relaxation of ligaments characterizing the lower animals (such as the guinea-pig, for instance) is absent as a rule in the case of the parturient woman. In the lower animals, too, a large quantity of mucus is poured out before labor, relaxing greatly the soft parts.

Causes of Greater Facility and less Danger among Savages.—Undoubtedly labor is less difficult and perilous among the black races. The causes are: (1). The head of the child is smaller, and not so strongly ossified. (2.) There is more muscular power, and thus labor is much shortened. The certain perils of protracted labor are thus avoided.

200. **Dangers Peculiar to Parturient Woman.**—There are many conditions present in the case of the woman from which the lower animals are exempt, and which increase the pain and the risks of labor. (1.) There is the implantation of the placenta. When it is removed, something like a raw stump is left. Hence bleeding, and even purulent absorption may arise. This is not the case with the lower animals, the maternal portion being left. (2.) There are numerous pathological states peculiar to woman. She is liable to rickets, mollities ossium, fibrous and osseous tumors, and malignant disease of the uterus, etc., etc., from which these animals are exempt. (3.) Woman is more affected by psychological influences. Emotion operates potently. A piece of very bad or very good news may arrest a labor—may induce a uterine inertia. The lower animals are not thus affected, although loud sounds, such as that produced by thunder, or artillery, or a hurricane, influence them. Cases have happened where a cow's labor was delayed by fright during a violent thunder-storm. So-called civilization enhances the difficulties of labor, just by inducing pathological conditions which are unknown in a more primitive and simple mode of life. Domestication of animals renders their labors more difficult.

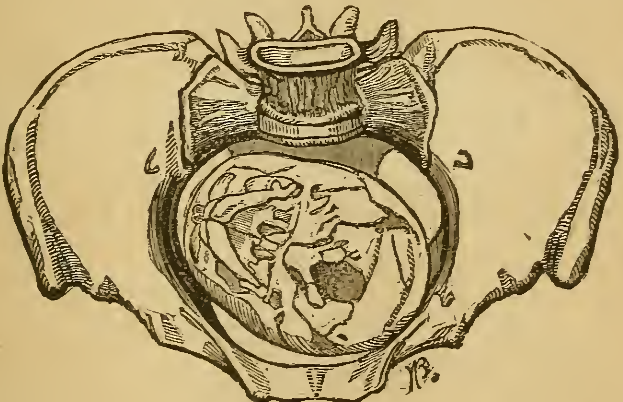

FIG. 12.—First Position.

(2.) *Body to be Expelled, or the Fœtus, etc.*—The child does not, as was imagined by some authors, assist in its own expulsion. It is quite passive, being grasped firmly by the propelling body. While not contributing to the work of expulsion, it is often, as we shall see, an impediment to it, but that is where abnormality exists. We have already noticed the dimensions of the cranium, and refer the student again to these.

(3.) *The Parts or Passages through which the Fœtus passes.*—We have also given the dimensions of these, and a short description of the axes and planes. The two axes, it will be recollected, form an obtuse angle with each other. The planes have a downward and forward direction. The course which the child has to take is a curved one—first downward and backward, then downward and forward. The way is a curved tunnel. The direction of the curve is seen in Fig. 4. The child is driven through this curved tunnel by the forces referred to, and, as we shall see, the head is compelled to change its position in the journey, so as to bring its various diameters into correspondence with those of the canal which it has to traverse. Were this not to happen, there would be a jam—the journey would be stopped.

201. **Position of the Fœtal Head.**—Some authors reckon and teach no fewer than eight positions; but the chief ones in which the head of the fœtus presents are only four. These are now well agreed upon by the principal obstetricians, and we shall adhere to them.

Positions.	Presentation.	Presentation.
	Occiput points to—	*Forehead points to—*
1.	Left Acetabulum.	Right Sacro-iliac synchondrosis.
2.	Right do	Left do. do.
3.	Right Sacro-iliac synchondrosis.	Left Foramen ovale, or Acetabulum.
4.	Left do. do.	Right do. do.

In these positions, the third is the opposite of the first; and the fourth of the second

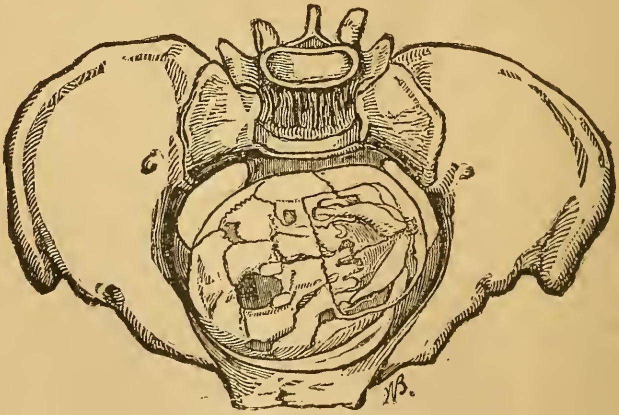

Fig. 13.—Second Position.

In order to appreciate the changes of the fœtal cranial position in its descent through the pelvis, notice certain movements to which it is liable. These have been termed as follows:

Obliquity, Flexion, Rotation, Extension, and Restitution.

These various movements of the fœtal head generally take place, but there are some instances where there is so much extra space, owing either to the diminished size of the head or the enlarged capacity of the pelvis, that more or fewer of them are wanting. Notice now the nature of these different movements.

202. (1.) *Obliquity of the Head.*—When the head enters the brim, the occiput and sinciput are nearly on the same level, but there is a lateral depression. The right side of the cranium—that is, in the first position—is rather lower than the left, the lowest part being the protuberance of the right parietal bone. It is this lateral depression that is called the obliquity of the head. Some able authors deny this obliquity.

(2.) *Flexion of the Head.*—As the fœtal head descends in the cavity of the pelvis, the occiput gravitates lower than the forehead, the chin pointing to the breast. This is what is termed the flexion of the head.

(3.) *Rotation.*—As the head of the fœtus descends further, the long diameter, which, when it entered the brim, was oblique, changes into the antero-posterior. This is the rotation of the head. In this movement or turn of the head about one eighth of a circle is described. If the head enters the brim transversely, then it makes the turn about one fourth. That is called the quarter turn.

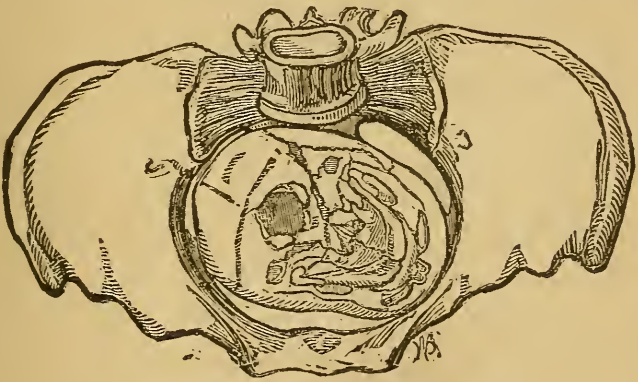

Fig. 14.—Third Position.

(4.) *Extension.*—After the occiput has passed under the pubic arch, the forehead and face of the child sweep down, the occiput being partly fixed. The chin is now also separated from the sternum, and the head thus emerges.

Restitution. There is a fresh rotation of the head after it emerges from beneath the arch of the pubis, unless the pelvis is unusually ample. It is restored again to the position which it held in the upper part of the pelvis. Such are the movements characterizing the cranium of the fœtus in its journey through the curved way. By flexion—that is, the dipping of the occiput—its entrance into the upper strait is facilitated; by rotation its progress is made practicable; by obliquity the smallest diameter is always presented to the pelvic canal; and by extension the emergence of the head is rendered more easy.

We shall now notice the various changes which the head undergoes in each position in its passage through the pelvis; or, in other words, the mechanism of the different natural positions.

203. **First Position, or Left Occipito-Acetabular.**—Here the posterior fontanelle points to the left acetabulum, while the anterior fontanelle looks toward the right sacro-iliac synchondrosis. The saggital suture occupies nearly the left oblique diameter of the pelvis. It is somewhat nearer the sacrum than the pubis, owing to the fact that the anterior half of the presentation is generally lower than the posterior. In this presentation—first vertex position—if the finger be introduced through the os, it will touch the tuberosity of the right parietal bone. As the uterus acts, and the head is forced down, while retaining in general the obliquity marking it at the brim, it assumes in many cases another obliquity—that is to say, the posterior fontanelle becomes lower than the anterior. It still, however, points to the acetabulum. Then, as the great master of labor mechanism, Naegelé, says, "When the head reaches the pelvic outlet, the posterior fontanelle, in obedience to the force of the uterine contractions, gradually moves from left to right until the occiput advances under the pubic arch. It is not the centre of the occiput that advances under the arch, but the head approaches the os externum with the superior and posterior part of the right parietal bone. It remains in this position until it has passed through the outlet of the pelvis with the greatest circumference which it opposes to it, when it then turns with its face to the right thigh of the mother."

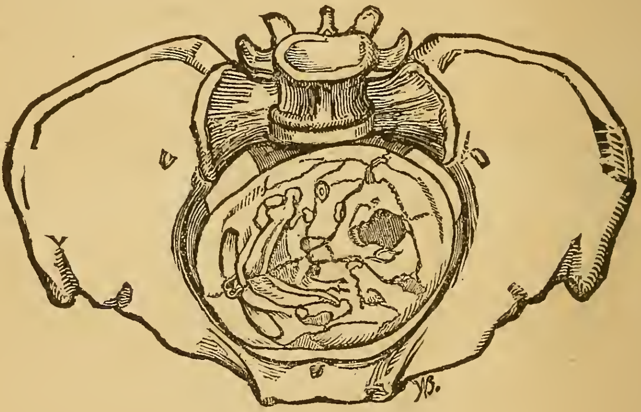

FIG. 15.—Fourth Position.

Second Position, or Right Occipito-Acetabular.—Here the mechanism is similar to that of the first position. The movements of flexion, descent, rotation, and extension occur as in the preceding, only the occiput turns to the right instead of the left. In this position impaction of the rectum may impede the turn of the head, and thus delay the labor.

204. **Third Position, or Right Posterior Occipito-iliac.**—In this position the posterior fontanelle points to the right sacro-iliac synchondrosis, while the anterior looks to the left acetabulum. The uterine contractions cause the posterior fontanelle to descend a little. The tumor of the scalp is upon the upper edge of the left parietal bone, and this is the part felt by the finger on making an examination. When the head is engaged in the cavity of the pelvis, it gets opposed gradually by the lower part of the sacrum, the coccyx, and the ischiatic ligaments, and is forced to alter its position; its great diameter turns into the left

oblique of the pelvic cavity; the posterior fontanelle is changed from the right sacro-iliac synchondrosis to the right foramen ovale; and thus it is converted into a second position, the face usually turning to the mother's left thigh.

Fourth Position, or Left Posterior Occipito-iliac.—Here the posterior fontanelle points to the left sacro-iliac synchondrosis, and the anterior to the right acetabulum. As the head is forced down, changes similar to those in the preceding position occur, only in the opposite direction, the posterior fontanelle going gradually from the left sacro-iliac synchondrosis toward the left foramen ovale. Thus, in the same manner as the head in the third position is changed into a second, the fourth is altered into a first.

Note well, then, that usually the third position changes into the second, and the fourth into the first.

205. If the pelvis is unusually ample in its diameters, or if the head be uncommonly small, or even where the pelvis is of the ordinary size, but the pains are extremely powerful, these changes may not occur—there may not be necessary pelvic resistance to induce them. In such a case, the head is propelled through the pelvic cavity as it entered; in the third position, the upper and anterior part of the left parietal bone, and a part of the frontal; and, in the fourth position, the upper and anterior part of the right parietal, with part of the frontal of the same side, corresponding to the pubic arch. As the head emerges, the forehead looks upward under the arch of the pubis. Only a small percentage of cases comport themselves in this way; and it is just as well, for greater delay and distress are occasioned. In former times such cases—that is, those with the forehead under the pubic arch—were deemed the natural outcome and termination of the third and fourth positions; but M. Renhac, and more particularly Naegelé, have shown us that this is not the case. Emergence of the side of the forehead is a deviation, and not the natural termination; and if the usual course is run, three becomes two, and four grows one.

Comparative Frequency of the Different Positions.—The first position is the most prevalent. It occurs in the proportion of about 70 per cent of all the head presentations. The third is the next most frequent; and the second and the fourth are very rare. The latter is probably the least common.

How to make out the Different Positions of the Head.—This is not a very simple matter, and not a few practitioners are unable to tell the exact presentation of the head until they witness the tumor on the scalp, The movements of the child occur more on one side than on another, and Naegelé has pointed out that when these are felt on the right side, we may believe that the head is in the first position; and when they occur on the left side, that it is on the second. This, however, does not enable us to tell a first from a fourth, nor a second from a third. In the first position the fœtal cardiac sounds are heard best in the left inferior abdominal region; whereas, in the second, they are heard loudest in the right.

206. **Presenting Part of the Head and Caput Succedaneum.**—Dr. Tyler Smith has pointed out that there has been a want of precise definition among authors in regard to what is really the presenting part of the fœtal head. It has been common just to say that it is the vertex that presents, but we know that it is not exactly this, but the superior and posterior part of the parietal bone. Moreover, is the presenting part to

be viewed as that which is first felt on introducing the finger into the pelvis, in the direction of its axes, or is it the part found lowest in the pelvis during the progress of the labor? It is best to consider the presenting part as that portion of the head of the fœtus felt most prominently by the finger on introducing it into the os, and the part that still remains most dependent during the remaining stages of the labor.

The caput succedaneum is the tumor formed on the scalp by the pressure of the fœtal head, first against the resisting circle of the os uteri, and then against that of the vaginal orifice. It always forms on the presenting part, and indicates it. It consists generally of serum, or serum and blood, and if there has been much resistance, a rigid os, and a slowly yielding vagina, it may be of great size. Old women will sometimes shake their head at it when it is huge, thinking something is wrong. It is surprising how speedily it vanishes after labor, and without any application whatever. Twenty-four hours or less will see it disappear. This caput indicates correctly the presenting part. In the first position it is found to occupy the posterior and superior angle of the right parietal bone, with part of the occipital, while in the second it occupies the left.

Cephalhæmatomata.—In addition to the "caput," but in much fewer cases, we have a small tumor, hæmatocele, due to the effusion of blood under the pericranium. It is commonly of the size of an almond, and persists much longer than the other tumor. We have known it last for weeks or months. One would sometimes think, on meeting with it, that there was a depression of bone; but the hollow is due to a ridge of osseous matter, which circumscribes the effusion. The tumor may be treated with a lotion of chloride of ammonium—gr. x. to the oz. of water, with the addition of one fourth part either of spirits of wine or vinegar. Iodine is also serviceable. Opening the little tumor is not very safe; in some cases fatal results have ensued. There is not the slightest call for such operative procedure, and it is astonishing that any one should think of resorting to it.

CHAPTER XVII.

NATURAL LABOR.

207. **Definition.**—Any part of the head presenting; labor not prolonged beyond twenty-four hours; unattended by difficulty or danger. Although a labor which we may term natural often extends to twenty-four hours, many are completed within a much shorter period. Twelve hours is a very common average, the first stage occupying eight hours, and the second four hours. Primiparæ are usually slower, owing to the greater resistance of the soft parts in a first labor. In women with a broad pelvis the child is often born in a very brief space, provided that the pains are strong and regular—say, in one hour or two, three, four. Most practitioners have patients of this class, and where, even when summoned early to wait on them, and responding no less speedily, they arrive after the birth of the child. In these cases the nurse will greet one with the exclamation, "You are too late, Doctor;" but very often the

doctor has work to do—viz., the placenta to remove, which is often a source of disquietude to the female attendant. But let us now notice the symptoms of approaching labor.

208. **Premonitory Signs and Symptoms of Labor.**—There are certain forerunning symptoms which announce the advent of parturition—the coming event casts something more than unsubstantial shadows before. It is important for the student to know these. Such forerunners are—rectal and vesical irritation, leading to griping pain, tenesmus, or diarrhœa; frequent desire to pass water; subsidence of the abdomen; painless uterine contractions; mucous discharge from the vagina, hemorrhoids, lumbar pains; and a feeling of numbness about the legs exist in some cases. Some females experience, before the approach of labor, feelings of anxiety, depression, or even despondency. Others are extremely peevish, captious, and irritable. Many females, on the other hand, are exempt from the most of these precursory symptoms. Notice now the signs of labor.

209. **The more Important Signs and Symptoms of Labor.**—These are:

(1.) Painful uterine contractions.
(2.) Muco-sanguineous discharge, or "show."
(3.) Dilatation of os uteri.
(4.) Formation of the membranous bag, or "bag of waters."

When all these signs are present, labor is satisfactorily announced; the diagnosis is easy.

(1.) *Uterine Contractions.*—There are painless contractions of the uterus, which must not be confounded with these. Those not painful are of a moderate character, and occur some days before the advent of the great event. It would seem as if the uterus, like a warrior, were practicing some time before the big struggle.

True Pains, or Uterine Contractions.—The true pains begin at the fundus uteri, and extend downward to the cervix. They are felt first at the back, and extend gradually to the front. They recur at regular intervals. They cause the formation of the bag of waters, dilate the os, and expel the mucous plug or show.

False or Spurious Pains.—These are irregular and limited contractions, arising from costiveness, flatulence, cold, fatigue, or the fœtal movement. They do not lead to the formation of the bag, nor the dilatation of the os, nor the dropping of the muco-sanguineous discharge. They are short and spasmodic, and felt chiefly in front. For these annoying false pains we are often obliged to give something. Begin with a dose of Ol. ricini, then, if necessary, 25 drops of Liq. morph.: 5 drops each of Tinct. zingib. and Tinct. camph. may be given as a draught in water.

(2.) *The Muco-Sanguineous Discharge.*—This is the plug formed by an increase of the natural mucus, tinged with a little blood. The contractions by dilatating the os, expel it, and it is often the first thing that announces to the female the beginning of her labor.

The dilatation of the os and formation of the bag we shall notice in describing the stages of labor.

210. **Stages of Labor.**—Some authors teach four or even five stages. We prefer adhering to three. These are, first, the stage of dilatation; second, the stage of fœtal expulsion; and third, the placental stage.

First, or Dilatation Stage of Labor.—How is dilatation effected? Some attribute the opening up of the os to the fœtus itself; but although its descent may help much in this way, it must not be viewed as the main cause. The closure of the os, or at least its constriction to a small orifice, is effected by circular fibres, and these constitute a sphincter. What makes this give way? (1.) Force exerted from above downward by the longitudinal fibres of the uterus. (2.) Liquefaction of mucus of os and cervix. (3.) Force of "bag of waters." (4.) Pressure of fœtal head. (5.) Active and inherent relaxing power of the os. The time occupied in dilatation varies much. Eight hours is a common period; in other cases, especially first ones, it may extend to 24 hours, or more. The pains of the first stage, as before noticed, are sharp, cutting, or grinding; and they are of short duration, with a long interval. As a rule, they are less easily borne than the bearing-down pains of the second stage, and the female cries out a good deal, and is often irritable and impatient under them. One cause of her sound—her outcrying in this stage—is, that she has more breath than during the second, for in this latter she is compelled to husband it in her efforts at bearing down.

Gastric irritation and vomiting are common during the first stage. The pulse is slightly quickened during the first part of a pain. Severe rigors often happen, especially when the head begins to press on the os. These are not the result of cold, but of pressure on the sphincter; and similar shivering is frequently experienced when pressure is made on other sphincters, such as by fæces on the sphincter ani, and a small calculus, or the catheter on that of the bladder.

Another phenomenon witnessed in some cases when the head is just passing the os, is a short-lived delirium. The female will utter an incoherent sentence or two, and then speedily come to her right mind. This must be due to the nervous relation existing between the os and the medulla oblongata, and between the latter and the cerebrum. Dr. Montgomery's essay touching this mental deviation is well worthy of perusal. The rigors above referred to may be termed innocent shiverings; but there are others, to which we shall afterward refer, which indicate serious mischief.

There are some auscultatory phenomena worthy of notice. Before a pain comes on, the uterine pulsations are stronger, and more distinctly heard. There is a rushing sound also, due to an agitation in the liquor amnii, produced by the contractions of the womb. Various other sounds are heard, the causes of which are not clear.

211. The "bag of waters" is formed in this way: The amnion, or most internal membrane, before described, contains more or less fluid; this is pressed upon by the contractions of the womb, and as the liquid cannot be reduced in volume while the bag is entire, it is forced to the point of smallest resistance, which is the os. As this latter opens up, the bag protrudes, and, indeed, its expansion is promoted by the protrusion. During the uterine contraction it is tense; in its absence, it relaxes and recedes. When the os is fairly expanded, the bag spontaneously breaks. If through preternatural toughness it remains whole, then we quickly rupture it. Not to rupture it now when the os is dilated would be an error as great as the breaking of it in its unexpanded state. Probably too many of us rupture it prematurely, knowing that uterine contraction, and, therefore, labor, is quickened by so doing; but it does entail rather more suffering on the mother, from the pressure of the harder head of the child. The student then should, as a rule, spare the bag until the full dilatation of the os; exceptions to this will be noticed afterward. When the fluid escapes, the uterus, acting at a greater advantage, contracts with more vigor and the head clears the os. In re-

gard to this latter, we find that thinness is unfavorable to the process of dilatation. When it is thick, and also soft, it expands much more readily.

212. **Second Stage of Labor, or that of Fœtal Expulsion.**—In this stage we have more powerful contraction of the uterine fibres—pains more frequent, prolonged, and severe. They are now of the bearing-down character, but although more distressing, the female cries less during them, owing to the fact that she has to hold her breath, in order that the chest may be used as a fulcrum for the auxiliary muscles of labor, those of the abdomen, back, etc. Churchill wonders rather at the straining and down-bearing of the second stage; but Dr. Tyler Smith has pointed out that pressure on the vagina excites more extensive reflex muscular actions than on the uterus itself. These vaginal excitor nerves are the excitors of the expiratory muscles of labor. Much aid is rendered, in particular, by the contractions of the abdominal muscles. We get direct expulsive powers from them, and a stimulus to uterine contraction. A new direction is given to the fœtus by the uterine contractions in the second stage. The axis of the head is made to correspond with the axis of the pelvic outlet, and gradually the flexible trunk is brought from that of the brim to that of the lower strait. In the second stage, the vagina and uterus form one continuous canal, the os being, as it were, obliterated. When bearing down, the woman, from holding in of her breath, and the temporary suspension of circulation, becomes red and swollen about the face, the veins become prominent, and the eyes staring. The pulse grows quicker, and perspiration may burst forth in great profusion.

Some evil results may have flown from this bearing-down and suspension of the circulation, such as emphysema of the face, neck, and other parts, and cerebral congestion. We have seen one or two cases where congestion of the lungs was produced; but in these there was the suspicion of pre-existing cardiac disease. Of course we would not be justified, in these latter cases, in allowing the second stage to be unduly prolonged, but would rather shorten it by means of the forceps. Convulsions may also result from the congestion of the nerve centres. The second-stage pains often produce a hypnotic effect, the female dozing in the interval of the pains. This is a merciful arrangement; for however ephemeral may be the slumber, it seems to be much relished by the woman, and brings her a slight accession of strength. She would give the world for a few hours of the same blessed repose, but alas! the terrible pains begin again, and unbroken sleep cannot be had until the labor is completed.

213. In cases where the head has bare enough space to come down, its pressure on the pelvic nerves occasions cramp of the legs, etc. This adds to the distress, and seems often worse to bear than the "pains." Another result of the pressure, where the rectum has not been previously evacuated, is the expulsion of its contents. The cramp is relieved by rubbing. On examining, at an early part of the second stage, we will find the head usually at the middle portion, from above downward, of the pelvic cavity. The rim of the os has disappeared, and the vagina has become soft and dilatable. The head is borne down by each pain, and recedes a little when it is over. This is continued, the progress exceeding the retrogression, until it arrives at the ostium vagina. When the head arrives at the perinæum, this becomes distended by it; and ultimately, by the action of the levatores ani, it is retracted over the head,

which, by means of the vaginal contraction, is driven into the world. The pain seems most intense just when the head is distending the external parts, and as it is about to be launched into the world. Then women who have borne their agony silently before will be compelled, by the refinement of the suffering, to utter one or more loud cries. When the child is born there is a glorious relief from pain, and the woman, unless "after pains" set in, enjoys a delightful repose. The mantle of oblivion is thrown over the past agony with a speed truly surprising.

With reference to the expulsive force exerted by the uterus during labor, Dr. Matthews Duncan has estimated it at about 3 lbs. to the square inch. Professor Haughton has also investigated this, and finds the uterine force to be a little over this; and the voluntary or expiratory force, about 38 lbs. The two forces combined are about 42 lbs.

214. **Third, or Placental Stage.**—This stage embraces the expulsion of the after-birth. The time during which this is effected varies, but very often the uterine contractions, which led to the delivery of the child, cause the detachment of the placenta. It may lie loose in the uterus for some time before the uterus begins again to contract. Ten to thirty minutes, or more, may elapse ere it is expelled. Some accoucheurs give the uterus what they call a period of rest, under the idea that it is fatigued by its exertions during the second stage; but reflex actions do not occasion fatigue. No doubt the pains cease often after the expulsion of the child; but this may be owing to the fact that the softer and smaller placenta fails for a time to stimulate or irritate the uterus to action. The hand pressed over and on the uterus will supply this stimulus, and this we do where, after a few minutes elapse, the womb does not offer to complete its work. As the placenta comes away, there is often a considerable flow of liquor amnii, and blood, with clots, which had been pent up before. With reference to the manner in which the after-birth is expelled (that is, when the uterus does it unaided), this is usually edgeways. If traction is made, it may come away in a variety of shapes, unless the cord be placed toward the edge, and that edge which is lowest in the uterus.

CHAPTER XVIII.

THE MANAGEMENT OF NATURAL LABOR.

215. **The Management of Natural Labor; Duties and Requirements of the Accoucheur.**—The deportment of the doctor in the lying-in chamber is of first-rate concern. If a young man, especially, he ought to muster all the gravity he can, and show as much kindness and gentleness as possible. Nothing will inspire more confidence than these qualities, added to a manifestation of interest in the case. This latter, indeed, is a potent key wherewith to unlock the door of a female's regard; and there is, on the other hand, no greater obstacle to this than cold indifference. A little roughness of manner may be forgiven, but an icy unconcern will not easily be forgotten. But roughness too should be dispensed with; and if it is somewhat natural to the individual, the more care should be exercised by him in conquering it. While kindness

is a gem, a little patience is an invaluable jewel, and one highly prized by the poor woman in the midst of her distress. We often possess this quality at the outset of our professional career in greater abundance than when we have fought into, it may be, an extensive and too-busy practice. If we lose it—this quality of patience—it will often be a loss also to the woman. Let us, therefore, even before the humblest patient, study to avoid at least the manifestation of impatience. There are certain general rules which should be attended to, and these we shall state; but, before doing so, let us notice the various articles which the practitioner should carry with him when called to a case of labor.

216. **Armamentarium.**—What should we have in the bag? Chloroform, ergot (carefully prepared liquor is best), solution of morph., hyd.; tinct. opii., or a morph. suppositor.; solution of antim. tart. That is medicine; now, what about instruments? A long-gum elastic catheter, and a pair of long-short forceps. Many do not recommend you to take forceps. We do, and for this reason; that a complication may arise at any time, and if *you* be a good way off from your residence, the patient may suffer, or even succumb from delay. Turning, of course, is often an excellent resource, but this may happen to be impracticable. It may be said that if we are in the habit of carrying instruments we may be tempted to employ them too often. As well might it be said that if we carry a lancet in our pocket, we will be disposed to bleed all the patients that come in our way. He would be a weak vessel, indeed, who could not trust himself to do the right thing in a matter of this important kind. Carry the forceps, then, but give the natural powers fair play. The hackneyed saying, "a meddlesome midwifery is bad," is only true if by "meddlesome" is meant unnecessary interference. There are numerous occasions where to meddle is salvation, and not to meddle destruction to the patient. In addition to the fore-named articles, there is another one sometimes finds the want of, especially in the humbler dwellings—viz., an enema syringe. A flexible one is easily carried, and may prove a useful time-saver to the doctor, particularly in first cases, and where the female has shirked aperients.

217. **General Rules for the Management of the First Stage.**—One's first inquiry should have reference to the pains, if there be such. We say, if there be such, because women will send for you when only perhaps a gush of water has come away quite painlessly. Are the pains coming regularly? you ask; and, if they are, where is their seat, and how oft recurring? also, if any discharge has come away, and the nature of it? When you believe the pains to be real, you propose to ascertain the presentation, etc. This is done by a vaginal examination. You say to the female, in a grave, kindly manner, that you "wish to find out if all is coming right," and she usually responds by acquiescence. It is rare that one is refused this request when it is thus preferred. We have known some students denied it, but that was when there was an air of levity about them, and indications of great obstetric ignorance and inexperience.

218. **Method of making the Vaginal Examination, etc.**—Patient is placed in the left-lateral position, near the edge of the bed; knees are drawn up toward the abdomen, the right one being a little elevated. The index and middle fingers of the left hand, besmeared with lard or butter, are then carried along the perinæum and into the vagina, in which canal they are directed backward and upward, until the os uteri is reached. We thus find out the state of the os—how far it is dilated, if it

is hard or soft, thick or thin, and, during a pain, how much it expands, and whether within it there is a bag forming, or, still more important, if any and what part of the fœtus is presenting. We should have said that the finger is to be introduced during a pain, but the examination should not be completed until the pain has ceased. By this examination, which should be made as seldom as possible during this stage, we further ascertain the state of the vagina as regards temperature, softness or hardness, dryness or moistness, etc. The condition of the rectum, too, may be made out, and the pelvis to a certain extent, such as whether it is ample or contracted, and free from abnormalities.

The position of the uterus itself may likewise be discovered. Is it parallel to the axis of the inlet? Does the os look too much toward the sacrum? etc.

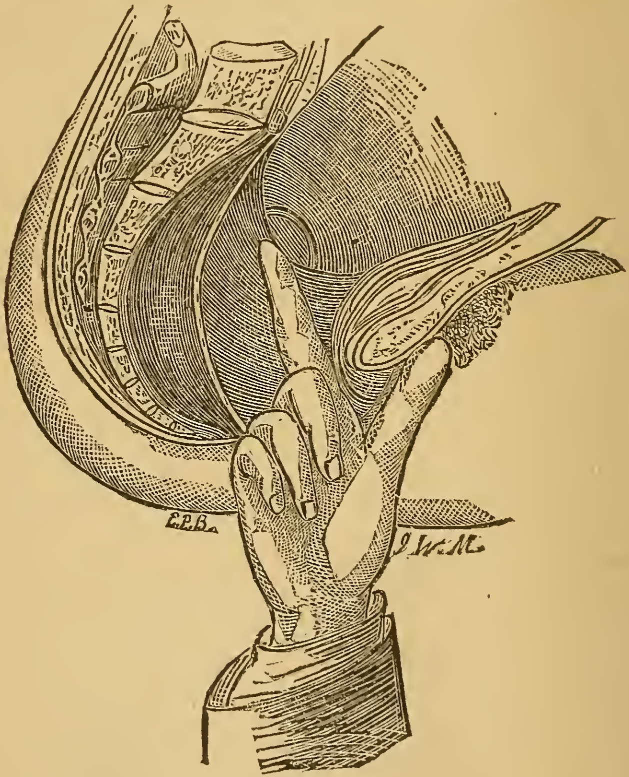

FIG. 16.

219. We are generally asked, after examining, as to whether " all is fair," and how long the labor is likely to last. To predict when the labor will be over is not an easy matter, and it is better simply to say that things are natural, and that, with the continuance of good pains, the progress and end will likely be satisfactory. If we were to guess a certain time, and state it, and the labor went beyond that, the female would likely be disappointed, and this feeling might help to paralyze her voluntary efforts; nay, as emotion often affects labor, it might suspend even the con-

tractions of the womb. We have seen evil done in this way. Prophetic work here, then, is unsatisfactory.

220. During the first stage of labor it is better for the female to move about the room, and to partake of refreshment if she can, and she should be kept as cheerful as possible. Some women will knit, others sew, and not a few even wash during this stage, laying down their work, perhaps, when a pain comes, and then resuming it again. We have seen mischief done, especially in first cases, by foolish and thoughtless persons actually relating cases where females had suffered a deal in labor. They often exaggerate a case, and say, perhaps, "that half-a-dozen doctors had been tearing at her for days." This is depressing treatment with a vengeance, at a time when a mental tonic is desiderated, and we would, of course, unceremoniously expel the person administering it, or at least treat her to rebuke.

The rectum and bladder should be evacuated if required—the former, if need be, by an enema. Bearing-down efforts are avoided: they are not called for during the first stage.

When the os uteri dilates very slowly—that is, when it remains just about the size of a sixpence or shilling after several hours' pain, a little gentle dilatation with the belarded finger will help it. This is characterized by Denman as an "abominable custom," and Churchill and the Irish school decry it also; but we are quite convinced that it is both a useful and harmless proceeding in certain cases. Of course, rude pulling and rubbing is not meant, but a gentle sweep of the finger now and then. A little tart. antim. helps in such a case, or inhalation of chloroform. Sitting over warm water does some good too. The rigidity is owing to absence of the natural mucus, to a plethoric state of the system, or to an inherent tenseness of the muscular fibres.

The diet should consist of light nourishment, and little, if any, stimulants should be given, unless for faintness. Nausea and vomiting (which are good symptoms, indicating, as they do, favorable dilatation of the os) should be treated with a little mace tea or soda-water. Any morbid symptom must be combated as it arises. It may be in our power to prevent these.

221. **Management of the Second Stage.**—When the second stage has set in, the female, at least in this country, usually goes to bed—a bed previously prepared by the nurse; that is, with sheets, or matting, or skin over the mattress, to prevent the discharges from reaching it. These, when removed at the end of labor, give the female a dry bed. Dr. Matthews Duncan strongly insists on the use of a bowl as preferable to cloths. See his paper in the third volume, Edinburgh Obstet. Soc. Transactions. In England the position is on the side—left lateral; in France it is on the back, as also in large part of Germany, with the exception of some parts of South Germany, where it is the same as with us. In various rural parts of Germany the woman stands, or bends on her knees with the legs apart. Some of the Irish in this city adopt the same plan. In China the women are also delivered on their knees. "Chairing" is a habit in the North of England. The female sits between two chairs, the adjoining front legs of the chairs being firmly tied together, and pillows placed on each seat. The body leans forward, and is supported either by a woman or a chair. The usual position in this country is a very suitable one. The knees are drawn up toward the abdomen, and, when the head is well down, a cushion or pillow, tied up so as to make it firm, is placed between the legs, to keep the right one as far apart from the

other as possible. A towel or sheet is fastened to a bedpost, in order that the woman may grasp it and make purchase, and sometimes, to aid also the voluntary efforts, a stool is placed against the footboard of the bed.

222. If the membranes remain entire after the second stage has begun, and the head has passed the os, they may be ruptured by the accoucheur. The child has sometimes been born with a part of the membranes over the head. This is termed a caul or hood, and the superstitious believe that it forebodes a bright future for the child. The caul itself is often kept and prized; and it has been offered as an article of merchandise, and purchased as a thing likely to bring luck to the possessor. Sometimes the unruptured tense membranes have been protruded down to the vulva, and mistaken for a limb of the fœtus. So soon as the membranes give way an examination should be made, in order to see whether any part, such as the cord or a hand, may have prolapsed. Sometimes the flood of water washes down a part in this way. From time to time we repeat this examination to ascertain progress.

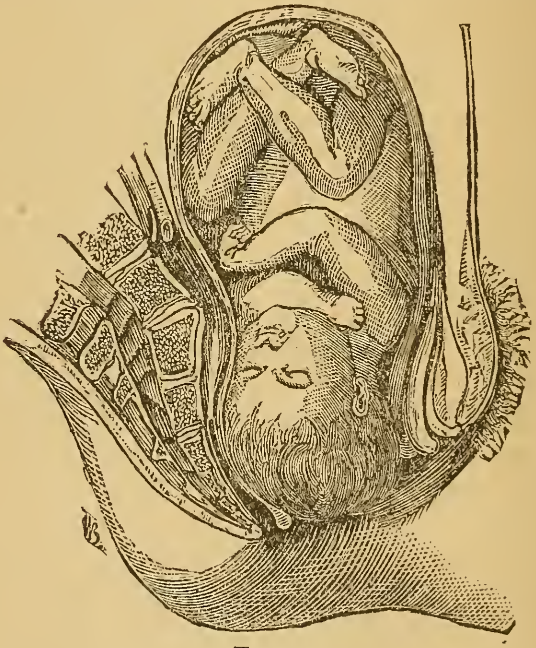

Fig. 17.

223. **Support of the Perinæum.**—When the head begins to distend the perinæum, then we may place one hand on it with the view of supporting it. This supporting of the perinæum is condemned by some, and elaborate papers have been written to prove its needlessness; but have we not also had books written denying that such a thing as motion existed, and writers telling us not to believe our own senses, and that right and wrong are convertible? We thoroughly believe in the utility of a little support; and that, when it is judiciously applied, it often averts laceration. How and when should it be rendered? (1.) Do not apply the hand too

soon, for, as pointed out by Tyler Smith, it excites reflex contractions of the uterus. Thus, if too early and too long applied, it may augment the expulsive uterine pains very much, and propel the child with such violence as to cause laceration. That would be a support leading to the damage we were anxious to avert. (2.) In supporting it, let the pressure be moderately firm and equable, and forward and upward in the direction of the pubis, so as to relieve the perinæum as far as possible from the pressure of the head. (3.) The radial part of the hand should not be above the inferior commissure. (4.) Moderate the too rapid passage of the head, but take care not to antagonize the uterine expulsive contractions. This we shall not do if we make our pressure, as before said, forward and upward. We may add that it is scarcely possible to avoid slight lacerations in primiparæ, but with careful support, and the female being in the lateral position, there is much less risk.

224. There is another kind of support which, during the second stage, affords comfort to the female; that is, over the lower part of the back and sacrum. She often cries anxiously for this during the pains. As the time when the child is pressing on the perinæum, and about to escape, seems the period of intensest pain, so that is the time when a few sympathetic and cheering words may be suitably, and with benefit, dropped into the sufferer's ear. They will help to carry her through the trying ordeal; to nerve her to the supreme efforts which she must sustain. We have referred to the back-support which most women desiderate so much, and find of such essential service; and here we may also notice another contrivance whereby this aid is rendered, and greater power conferred, on the voluntary expulsive forces. We allude to Protheroe Smith's pelvic band. Dr. Smith is of opinion (and we think he is right) that many of our women, owing to the vices of civilization, degenerate, among other things, *qua* muscle; and in consequence, during parturition, the lumbo-abdominal muscles are unable to render that aid to the uterus in its great expulsive work which is so much required.

225. This voluntary force, we have before noticed, is vastly more potent than the involuntary (eight times more so), and if, by any means, we can keep it up to the mark among the degenerate daughters of civilization, the invention ought to be hailed as a welcome boon. Dr. Smith says that his apparatus enables this non-voluntary force to be put forth, at the same time that it supports the lumbar region in an efficient manner. If this be so, we wish it success, for it is not easy to secure satisfactory lumbar support from the nurses usually agoing. You tell them to "hold the back," and they obey, but only for a moment. We have often been unspeakably annoyed at this restlessness; and though having no objection to skilled and expert obstetric women, we have been led to the reluctant conclusion that the right material for an efficient midwife is rarely to be found among the softer sex.

The accoucheur, during the first stage, need not remain in the lying-in apartment, but now, when the labor has advanced to the second, it is better to be present; for when everything is natural, and the expulsive forces are strong, the head may come down very rapidly, and make its emergence before our hand is applied to the perinæum, mayhap tearing the unsupported parts. In first cases especially, we do not require to wait on during the first stage; and if, on being called, we find the os no more than the size of a shilling or so, we may leave and prosecute any other work on hand, at the same time indicating when we think it necessary to return.

226. When the head is born, we examine to see whether or not the cord be around the neck, as frequently occurs; and if it is thus coiled, we pull it down gently, and slip it over the head. No forcible dragging should be had recourse to, otherwise, from the spiral arrangement of the vessels, the circulation in the funis might be interfered with. In some cases it has been necessary to cut the funis to enable the child to be expelled. A cord under six inches in length might necessitate this. Any discharge about the child's mouth or nostrils should be wiped away whenever the head is born. No forcible dragging out of the child should be had recourse to, otherwise uterine inertia may be caused. This would be a bad preamble to the third stage. But if the uterus should become lethargic, and not attempt the expulsion of the shoulders and body in the course of a minute or two, we must rouse it to renewed action by a little abdominal friction. It is rare to find it not responding to this by a return of the pains; but if it does not, and there be risk of the child perishing from apoplexy or strangulation (as indicated by facial cyanosis), then must we supplant the uterine function and help the child out with our hand. To this procedure it may be legitimately objected that we run the risk of inertia and hemorrhage, and that according to the prevailing code we are not warranted in exposing the mother to undue risk for the sake of the less valuable infant. This is plausible; but, in reality, hemorrhage is not very common, even after thus extracting the child, owing to the contraction of the womb, in virtue of its elasticity. Besides, the very process of extraction rouses it to a sense of duty (if we may so speak), and needed contraction is resumed. If not, we must administer the great oxytoxic, ergot.

227. **Duties after the Birth of the Child.**—Remove the infant from beneath the bed-clothes, and replace these around the mother to prevent her from catching a chill. Tie the funis with a ligature of twine (or narrow tape twisted into cord), in two places; the first, from two to three inches from the abdomen of the child; the second about two and a half inches from the first, and nearer the placenta. Then divide the funis between the two ligatures. We may, with advantage to the child, delay the application of the ligature for a minute or two, if it is weak, and if satisfactory respiration is not established. Some authors object to two ligatures, holding the view that a little bleeding from the open extremity of the funis favors the speedier expulsion of the placenta. We deem this a mistaken opinion, believing that placental expulsion, so far from being facilitated by the method, will be rendered more difficult and tardy. The placenta is flabby enough, without making it more so; and, if we could, we would rather inject blood into it to make it more tense. It is quite clear that the uterus has more power over a tense than a soft body; it can grasp it better for the purpose of extrusion. Another reason for not sharing this opinion of Dewees and others is this: there may be twins, and a vascular connection between the two placentæ. A third is that given by Rigby, viz., that in cases of twins, and the second, perhaps, still-born, we might get the blame for not placing a second ligature at the open extremity of the funis. Some schools, such as the Copenhagen one, do not recommend a ligature at all. They say there is no risk from bleeding after the establishment of respiration; and the lower animals are cited in support. But in this case, as has been pointed out, the method adopted is a kind of torsion.

228. We certainly say, tie the cord, and tie it well and carefully; moreover, there is no harm, but the reverse, in adopting Hamilton's plan of

applying a third after a time. The Whartonian gelatine contracts, and in an hour your ligature, though firmly applied, may become quite loose. We have done this for a long time now, and saved ourselves much trouble, and, what is better, conserved for some infants no little blood. We have known some stupid nurses send for us after we had left the house; and all for a little funal bleeding (the result of gelatinous contraction), which they could have stopped. The most careful tying of the cord will not save you from being impeached with carelessness if blood to any extent drains away. A good thing, then, is a third cord after gelatinous shrinking. A rude way of tying the cord is said to have led to acute inflammation of the vessels, and the extension of this; and Schöler thought that this was the occasion of Trismus nascentium in some instances. He thinks that tying it too firm with twine may give rise to this. Of this there may be some doubt. The first thing to be done after the separation of the child (which is only the work of a minute), is to place a hand over the abdomen. This is done to find out if there be another child; and is also the first step in the third stage which we are about to consider. If a second child is detected, shall we tell the mother? 'Tis better not, seeing how great a factor is emotion. We might agitate and depress the woman thereby, and thus interfere with the labor. It is as well to tell the nurse or a friend, however, for unless we do this, we may be viewed as not thoroughly up to our business. We can do it by signs, such as holding up two fingers, and giving a significant nod. In this way the patient may be kept for a little while, at least, in the dark respecting the second ordeal through which she has to pass.

229. **Third, or Placental Stage.**—This last stage of labor is hardly inferior to the preceding ones in importance; for if not carefully and skilfully managed, a labor natural and happy in its previous stages may be rendered the reverse in this. We have known everything go smooth in the first and second stages, and unfortunately in this one. There has been, in our humble estimation, a deal of hereditary erroneous instruction "abroad" in reference to the management of the placental stage. The text-books, in some cases, have given forth an uncertain sound; in others, an erroneous one, on the subject. Opinion has oscillated a good deal too at different periods between the extreme of hasty artificial removal, and the extreme of an implicit trusting to Nature. The former extreme had disciples in Paré, Chapman, and others; the latter in Ruysch of Amsterdam, and Dr. Hunter. Hunter, however, came to alter his plan, after discovering the shortcomings of unassisted Nature; but still he counselled waiting to see what the natural powers could effect for a period of four hours. These shortcomings were great and glaring; for Hunter and his colleague Sandys had cases where the placenta was not expelled in twenty-four hours. For a long period now we have had prescribed in the obstetric works a kind of middle course between these culpable extremes, but one, in our view, inculcating rather too much delay still. The plan may be thus stated: Wait for an hour to see what the natural forces will do; and if the placenta be not extruded at the end of this period, it is to be removed by the hand. Some interpolate a cautious tug or two at the funis during the hour of expectancy. This more moderate course is now also passing away. It is better certainly than the Hunterian one of dwelling a couple of days or so in a lying-in house waiting for the appearance of the reluctant cake; but yet it is not the right or the safe system, as before said. But now

we must state what that plan is. After the completion of the second stage, or the birth of the child, the uterus has certainly a proneness in many cases to pause in its work of contraction. This cannot be owing to fatigue, for reflex actions do not induce exhaustion, but may be due to the fact of the smaller and softer placenta failing, for a little while at least, to irritate the uterus, as did the larger and firmer body of the child. The uterine fibres, too, may fail to grasp the softer mass so well as this latter. Be that as it may, we find the uterus pausing ere its work is fully completed, and this it is which we are to endeavor to prevent. The modern plan, then is as follows:

230. **How to Promote Expulsion of Placenta.**—Whenever we have given the child to the nurse, we place a hand over the fundus uteri (some even do this just when the child is being expelled), grasp it moderately firm over the insertion of the oviducts, and carry it gradually down toward the cervix. If a pain, as is likely, is thus aroused, continue the pressure from above downward; in fact, let external manipulation be simultaneous with uterine contraction. It is both a provocative of the latter and an adjuvant of it. In this way the lethargic condition of the uterus is overcome, and it continues the expulsive work until labor is completed. Out comes the placenta in a very few minutes, with the slightest degree of funal traction. Much credit is due to Professor Credé of Leipsig for advocating this method, because in Germany the text-books, as a rule, teach more of traction than external compression. Many distinguished Germans, such as Grenser and Winckel, are satisfied of the superiority of the Credéan method, and recommend and practice it. So German opinion is not correctly mirrored in the *Lehrbucher*. Although we cannot share the enthusiastic opinion of Credé, that this method of external manipulation will succeed in altogether "scaring away the ghost of an adherent placenta," we firmly believe that it has done excellent service. It has conserved blood immensely, averting, as it does, the tendency to post-partum hemorrhage occasioned by traction, more especially if this traction is not synchronous with uterine action or contraction.

231. **Traction.**—But if the method of compressing the uterus pretty vigorously in this way—beginning at the fundus, and bearing from above downward—does not lead to the expulsion of the placenta, when should assistance, in the form of traction, etc., be rendered? We believe that twenty minutes is quite long enough to wait, as a rule, even though hemorrhage does not set in. The reason is that the parts are apt speedily to contract a good deal, and thus narrow the way. When we have resolved to interfere, what shape should this assistance take? It need not be traction first; rather compress again externally with the left hand, and introduce a finger or two of the right, and with these tilt up a portion of the afterbirth and admit the entrance of a little air, and this will often favor expulsion. If we find the insertion of the cord easily, it is lying far down, and may be expelled by a cough or sneezing. Many old women prescribe snuff with the view of exciting the latter; and it is common to bid the patient cough. There is a deal of traction at the cord practiced yet, we are aware; and although, when the curve of Carus is kept in mind, and the force made to correspond to it, little harm results from it in many cases, yet it is not a very sound proceeding. The reason is this: that you can hardly pull it out in the way that the uterus expels it. That plan is edgeways; and even when you know precisely where the afterbirth is lying, you cannot easily, by simple traction on the cord,

withdraw it in that manner. The cord is usually inserted about the centre. Well, in pulling, you compel the whole area of it to present, and thus it cannot make its exit through the passages until it is crumpled and doubled up. This accounts for the force required in some cases to bring it out, and also for the giving way of the funis even where it was firmly inserted. It would be better, then, even to grasp the placenta itself with the hand, and thus pull it down in the natural direction. In employing traction, one thing in particular must be kept in mind—viz., to pull when the uterus is contracting. It is the traction during uterine inaction which does the mischief, which leads in some cases to serious hemorrhage.

232. We are not to be understood as opposing a little steady traction in the right axis, then, during uterine contraction; only we say that the method of external manipulation, properly practiced, renders it unnecessary in many cases. When the uterus does not manage to expel it in this way, then traction sets in. But the best traction is not that of pulling by the funis, but hooking a portion of the placenta itself with the fingers, and helping it down edgeways. Sometimes we facilitate its descent by twisting it round a little, and giving it a rope-like form. There is often some trouble with thin membrane lengthening out behind, and threatening to break off and remain *in utero*. This we twist round into a cord, and afterward withdraw it slowly and cautiously. Bits of membrane left behind set up different symptoms in different women. They rarely fail to cause pain; they often excite bleeding, and in some very sensitive constitutions they have irritated on to dangerous convulsions. They should be carefully removed, then, with the finger. Clots remaining behind are also a source of irritation and hemorrhage, and should therefore be removed. By the plan of external manipulation we have fewer of these, because we have much less bleeding; there is rarely to be seen those great gushes of blood and clots which marked the plan of protracted waiting upon Nature. We should mention that the placenta is most commonly separated from the uterine wall at the time of expulsion of the child. It is useful to know whether separation has taken place or not, and this we ascertain by grasping the funis and finding whether there be pulsation in it. If not, then it is lying unattached. Students, we know, often forget this simple test, and when they have an encysted afterbirth, flatter themselves they have got a case of adherent placenta. When the placenta is delivered, it is well to inspect it. It may prove a nice specimen for "pickling;" but that is a small matter: a stronger reason is, that we ascertain if it has come entirely away.

233. It may have been morbidly soft, and a portion have become separated and remained behind, the source of future mischief. The cord has often been dragged away in traction; this is easily done, it being frequently loosely attached, especially in battledore placenta. We have found midwives a good deal given to wrenching off the funis, and have often had to finish their imperfect work. If the cord should be torn off, we must just seize the placenta itself with the hand, and bring it away. If we cannot secure it with a finger or two, the whole hand must go in in quest of it; and very often this so irritates the uterus that it replies by potent contraction. We don't believe that the clean and cautious hand does injury in this way.

234. **Placenta Succenturiata.**—We have referred to the possibility of a portion of placenta, where it is preternaturally soft, remaining behind; but there is another thing that may be left in the uterus when we never so much as dream of it, and that is a supplemental, or supernumerary, after-

birth. The occurrence is as rare as quadruplets. Many gray-haired brethren have never come athwart it, and not many specimens are to be had. This extra placenta is much smaller than the normal one.

Fall of the Fœtal Portion of the Cord.—This part usually drops off on the fourth or fifth day, a sort of dry gangrene preceeding the fall. There is a circle of ulceration at the part of separation, and it cicatrizes and heals gradually. If this should not be the case, as often happens in strumous children, and where the part has been exposed to much friction, and remains red, raw, and moist, then we apply some astringent to it, such as oxide of zinc, tannin, alum, nitrate of silver, etc.

235. **The After-management of Natural Labor.**—After the completion of labor, it is necessary to apply some abdominal support in the shape of a binder. This should be so constructed and applied as to afford moderate support to the abdomen, and moderate pressure on the uterus. The uterine pressure varies with the circumstances of the case. If there is a tendency to uterine flabbiness and relaxation, let the pressure be pretty firm; if the womb contracts into a firm ball, it may be less so. Injury may be done by too thick a pad, too firmly applied; it may press down the uterus too much, and irritate it, and it may even indent the fundus, and thus initiate an inversion. The binder should be worn for a fortnight, and tightened and readjusted by the nurse when required. As there are gentlemen who decry the supporting of the perinæum, so there are those who make a crusade against the binder. We believe it to be useful, although not always indispensable, any more than ligature of the funis is, and therefore we recommend it. Another consideration is this: that ladies find the bandage gives them comfortable support. They believe it prevents them from becoming loose-bellied; and if they should suffer from a pendulous abdomen afterward, they will credit it to the want of the binder, and not readily forgive the doctor for destroying their elegance.

236. It is customary for the accoucheur to remain not less than an hour in the lying-in room after the termination of labor. This is a wise arrangement, because it affords him time to see that the uterus contracts properly, and that there is no preternatural bleeding. He ascertains also the general condition of his patient, the state of her pulse, etc. If, after we remain for an hour, and find the discharge moderate, the pulse not too quick (under 100), and no other threatening symptoms present, we may make up our minds to retire. Before doing so there are two things to be attended to. (1.) Place the hand over the abdomen again, in order to feel if the uterus is firm; and (2.) Examine the napkin which it is customary for us to apply to the vulva after delivery. This soft towel or cloth gives us a good indication of what has come away from the uterus during the hour; but see that it is carefully applied, for we have known it placed a distance in front of the vulva, and be almost without a stain even when flooding was going on. We have a vivid recollection of a case of this kind. We examined the napkin, and found it to indicate only normal discharge. We then felt the pulse, and found it pacing at the rate of 130. We examined the bed below the external parts, and found a basinful of clots. The napkin was wrongly placed, and thus, if trusted to alone, would have deceived us. We immediately gave a dose of ergot, undid the binder, grasped the uterus, cleaned out clots from the vagina and os, and everything went well. A rapid pulse always makes us chary of leaving, for hemorrhage is often announced by it.

With a pulse moderately firm, and under 100, the uterus contracted into a firm ball, and little discharge coming away, we leave the patient at the end of the hour without apprehension of evil.

237. **Medicines, Stimulants, Narcotics, Aperients, Drinks, etc.**—The woman after labor desiderates two things greatly—viz., repose and sleep. She has passed through a severe ordeal. Her frame has been enfeebled by the muscular efforts of labor, by loss of blood, and perhaps by her abstinence from food and want of sleep; and her nervous system has received a considerable shock. Rest, slumber, and renewed strength are therefore required. How are these indispensables to be obtained? As regards sleep, if tired nature sends the sweet restorer, let no opiate be given. She often does so, and often fails. If the woman remains sleepless for a time, and suffers from excitement, we may have recourse to a little morphia. Try first only 25 minims of the solution. We are careful not to give it in large doses, because such are antagonistic to uterine contraction, and therefore promotive of flooding. Repose will be favored by absence of noise and exclusion of light.

After-pains.—These in multiparous cases (in first cases they are seldom experienced), from their severity and frequency, often destroy both rest and sleep. If so, we are justified in meeting them with an opiate, such as sol. morph. or tinct. opii, in 25 minim doses. This amount will soothe without antagonizing the contractions of the womb. Some give an opiate in every case; and if it is only a moderate dose, it may allay irritability, and do no harm. The after-pains are just a recurrence of the uterine contractions, set up to expel any contained fluid or clots, and they form, perhaps, part of the process by which the womb becomes of diminished volume. It has been proposed to prevent them by the subcutaneous injection of ergotine, and external manipulation during the third stage.

238. If the labor has been very severe, or if the female be naturally feeble, some stimulant may be given soon after labor—either wine, good whisky or brandy. The pulse, which is increased considerably during the second stage, falls after the conclusion of labor down to its normal rate; then, in eight hours or so, there is a reaction, when it mounts up again to what it was before the child was born. It then falls until re-excited by the secretion of the milk. The nurse should see that the woman is not allowed to exert herself in any way for several days, perfect rest in the recumbent position being requisite. Fatal syncope has been induced by assuming too soon the erect posture. Of course, strong females can do what more delicate ones cannot; but it is best to inculcate caution. Some nurses fatigue their patients by changing their linen soon after labor. This should not be done unless matters are arranged so that the under-dress can be replaced without rising up. But it is better to see that the clothing be doubled up when the second stage begins, and thus to have it out of the way of the discharges.

It is usual for the doctor to pay his first visit about six or eight hours after he has left. By this time the woman may have had some sleep; and he will ascertain this, and whether she has suffered from much pain, the quantity and nature of the discharge, etc., and whether she has passed water. In ordinary cases, the lochia will have soiled from three to four towels by this time. The pulse will also merit notice. We will see that it is not too quick or too full; if 80 to 90 we will be pleased with it. A pulse above 100 makes us anxious; one of 130 to 140 says that mischief is brewing. Our visits are repeated daily for ten days, and, indeed, it is as well for the first two or three days to call twice a day. At these visits we ascertain the state of the pulse, the nature and quantity of the lochia, and whether or not there is uterine pain. If pain exists, is it pretty constant, or intermittent only? Severe uterine pain, pretty constant, and gradually deepening, occurring about the second or third day, looks ugly, and all the more so if there be a rapid pulse. But we must not confound the "after-pains" with incipient inflammation. After-pains are often exceedingly severe; but they are not constant, but intermittent. They do not quicken the pulse, and with them there is no abdominal tenderness. If the female has difficulty in making water, warm fomentations to the external parts may help, or a draught of spt. eth. nit. and tinct. hyoscyam., or a morph. suppository may be given. These answer where it is due to spasm; in cases of contusion and tumefaction we may have to use the catheter. Our visits need not extend beyond twelve days in natural cases. During all this time the woman should scrupulously maintain the recumbent position, in order to avoid displacements, etc.

239. **Lochia.**—The lochial discharge, or "cleansings," as it is popularly termed, is of a sanguineous character at first, but soon becomes of a lighter color, and of a serous quality. This altered condition of the discharge is due to the changes taking place in the uterus. Just after the completion of labor, the uterine vessels were large enough to permit the escape of blood, but by the contraction of the uterus these are diminished very much, and serum chiefly, instead of red globules and fibrine, oozes through. Sometimes, however, owing perhaps to the patient exerting herself too much, the uterus again relaxes, and blood is permitted to pass. In some cases the lochial flow will continue for five or six days only; in others for two or three weeks. In the case of dead-born children, it is usual for it to dry up in a few days after labor, and without any bad results. A speedy drying-up of it will not alarm us, provided that this is not followed by pain or fever. The disintegrated decidua is mixed with the discharge, as also cervical and vaginal mucus. A peculiar odor attaches to the lochia; and this is said to be more penetrating in dark-complexioned females. When the lochial discharge is too scanty, and some little pain, and perhaps feverishness, happens in consequence, we should apply a warm fomentation or poultice over the vulva. If, on the contrary, it should be too abundant, we may give some iron or ergot, or both. Gallic and tannic acids are also of service. When the discharge is scanty and fetid, good is done by throwing some warm water into the vagina occasionally; at other times with the addition of Condy's fluid (sol. potass. permang.)

240. **Condition of Uterus after Delivery.**—The post-partum alterations of the uterus (involution) consist in the degeneration and removal of the large muscular fibre, and the redevelopment of the smaller and rudimentary ones characterizing the virgin state. The internal surface of the womb, when examined within a day or two after labor, presents at the placental site a raised appearance, due to greater thickness at this part, and the remains of the decidua serotina. The mucous membrane is loosened and softened, and dotted by patches of decidua. A peculiar greenish color marks the whole inner surface, not unlike the appearance presented by gangrene. Where the after-birth was attached are still to be seen the open mouths of the veins and arteries, with coagula suspending from them, like diminuitive icicles; and between these orifices are found the remains of the hypertrophied mucous membrane, or decidua serotina. In the closure of these vessels no pus is thrown out; the ad-

hesion of their sides is brought about independent of this, and probably by the mere contraction of the organ. The os and cervix have a bruised appearance, and are often found lacerated.

Some authors believe that the entire lining membrane is shed at the time of parturition, but others deny it strongly. Virchow is among the latter; and Matthews Duncan, who examined a number of cases, also denies that the membrane is exfoliated except where the placenta was inserted.

The vagina soon contracts after its extensive distension. It may remain tender and painful for a day or two, especially if it have been lacerated a little, but it is speedily restored. The vulva sometimes smarts for a day or two, but the application of a little lard, and occasional bathing with lukewarm water, will allay this.

Dr. Serdukoff of Moscow has contributed a good paper on uterine involution, which will be found in the Transactions of the Edinburgh Obstetrical Society, vol. iv.; but on this subject I think I may venture to say that I have anticipated him to a considerable extent in a paper "On the Causation, etc., of Uterine Sub-involution," published in the third volume of the same transactions.

The main facts are: The period of uterine shrinking, involution, or diminution, varies greatly in different women. In one case the process may be accomplished in twenty days, in another not before six, to eight, or even ten weeks. The fundus and body of the uterus diminishes in size more speedily than the cervix. Non-lactation retards involution, as likewise previous inflammation, and the strumous constitution. Oxytoxics, such as ergot, in particular, promote the process.

241. **Diet of the Puerperal State.**—The question of diet is one of much importance. The older authors rather stinted the puerperal woman, being apprehensive that aught beyond the sparest feeding might beget such disorders as metritis, puerperal fever, phlegmasia dolens, etc.

This sort of regimen is now pretty well exploded. We do not, as a rule, keep them on gruel or thin slops for ten days, but deal much more generously with them. The reason of this is, that we believe that the debility and exhaustion incidental to labor demand and are best repaired by, the employment of more nutritious food. When we have a non-puerperal patient suffering from great weakness, we prime him or her with extract of meat and wine, etc.; therefore, why deny the same fare to the prostrate female in childbed? Ah! it may be replied, that is quite a different thing; the puerperal state is peculiar, and prone to fever, etc., and, consequently, good feeding may induce these ills—may excite milk fever, or metritis, or peritonitis, and so on. We do not believe this. It is one thing to keep pouring stimulating diet into a patient when inflammation or fever has set in, but quite another thing to act thus liberally when no symptoms of these are present. There is little fear of moderate good feeding producing those evils, and perhaps it is not too much to say that there is more fear of engendering them by abstinence.

242. The chief dread in former times was in regard to the "milk fever," as it is termed, which comes on about the third or fourth day; but M. Pajot has shown that this is very much of a bugbear, and that we may attend hundreds of cases without meeting with more than a little ephemeral excitement of the circulation and increased temperature. Were these unusually great, we would be careful not to stimulate. In regard to inflammation of the uterus and peritonitis, their etiology is now better understood. They are due either to injury of the parts, or to

septic agencies acting internally or from without. A vigorously-contracting uterus is the best safeguard against the absorption and operation of the latter; and nutritious food, by supporting the general strength, will conduce to this desirable condition. On the other hand, a low diet will favor a debility inimical to due uterine contraction. As regards phlegmasia dolens, we also know now that a nutritious diet is likely to do it good rather than the reverse. Modern pathology has pointed out that it is connected with depressed vitality, and a generous diet may help in warding it off, instead of wooing its presence,

A spare diet, further, instead of promoting recovery, tends to hinder convalescence. Dr. Oldham has pointed out this very clearly, and condemned the system. Dr. Graily Hewitt has also written ably on the subject, and recommends a liberal diet soon after labor. We have been in the habit of allowing fish, eggs, white meat, etc., after the fourth day for a number of years. The diet, then, should be as follows:—For the first four days, slops, tea, bread, gruel, panada, sago, corn-flour, arrowroot, rusks, etc.; after this, and when the aperient (the best is castor-oil), which is usually given on the third day, has operated, beef-tea, chicken, and chicken broth may be allowed. A chop, or tender steak, or fresh egg, may be given on the fifth day. A little claret and water for a drink, but little wine of a stronger kind until the excitement of the milk secretion has subsided.

243. **The Breasts and their Secretion—When to apply the Infant, etc.**—From the second to the third or fourth day the breasts begin to expand, and are the seat of darting pains. At first there is nothing but a serous fluid (colostrum) in them, but soon the true secretion, milk, appears. It is ushered in frequently by rigors, pain of the mammæ, and a quickened circulation. When should the infant be applied to the breast? Well, there is some difference of opinion here among authors. Some hold that it is best to apply the child early, say after the mother has rested for ten or twelve hours; while others, such as Dr. Ballard, hold strongly that it is hurtful to the child to apply it so early, when there is nothing for it to get but colostrum and air. This is said by Dr. Ballard, not only not to be decent feeding, but positively hurtful, engendering as it does flatus, diarrhœa, and irritation of the stomach. Our own opinion is this, that there are evils connected with both plans; but there are fewer with an early than a late application. If you apply the child early, there may be little for it to get, and it may be purged a little with the colostrum; but you are drawing out the lacteal ducts, and exercising an almost talismanic influence on the secretion. Delay this application for days, and the milk will be slower in coming, nay, it may retrocede, or refuse to come at all. The bottle, we are persuaded, often comes of delay here. Although the child be applied early, this is chiefly for the purpose of wooing the lacteal secretion; and, for three or four days, we may give the infant some cow's milk and sugar and water, in order to keep down the flatus and the gastric irritation which the early contents of the mammæ beget if given alone. Our view, then is this: *Early application of the infant favors the early flow of the milk, although the feeding got from the breast the first day or two requires to be supplemented.*

244. **The Bottle.**—In feeding the infant, the spoon should be used—that is, when the child is to be fed at the breast. If we begin with the bottle we may have to end with it, for the child rapidly comes under the sway of habit, and getting, as it does in general, out of the bottle teat, a profuse and easy flow of milk, it goes back to the less generous mother's

nipple with reluctance—nay, may refuse it altogether. When the mother is too feeble to suckle the child, or when an unwilling secretion recedes, owing to too long delay in applying the child, then either a wet nurse or the bottle must be had recourse to. The question may fitly be asked, why do so many modern mothers abdicate the natural function of lactation? Does their doing so indicate indolence or betray physical degeneracy? Often the one, and not seldom the other. In either case it is a blot on our civilization. Children frequently thrive pretty well on the bottle, but in other cases gastric and enteric disorders are set up, leading to other ailments, which often end fatally. Especially is this the case where the quantity of milk is not well regulated—where the child gets a great deal more than what the parent can yield. At first the bottle should be made up of two parts of cow's milk and one of water, with a little sugar; after a month or two it may be made stronger. If the stomach come to reject it, and the bowels get disordered, add a little lime water; and it is a good plan to give arrowroot, gruel, or gelatine for a change occasionally. We need scarcely add that the bottle should be kept strictly clean.

CHAPTER XIX.

OF CERTAIN FŒTAL ABNORMALITIES.

245. **Of certain Fœtal Abnormalities, Suspended Animation, etc.**—We now proceed to notice briefly certain defects characterizing the infant at times. It may fail to respire when born, owing perhaps to the nature of the labor (the lungs being in a state of atelectasis), or from syncope. If cardiac pulsation exist, we ought to do everything in our power to rouse it from the condition of suspended animation. We have succeeded with children after thirty or forty minutes' perseverance. Various plans may be tried. If the cord be pulsating, it may be as well not to sever it for a little, unless the child be very cyanotic, when we may try a little bleeding from the cord. Then we give it some slaps on the buttocks, or shower a little cold water over the face and chest, or place it alternately in hot or cold water. Try to excite respiration by the well-known plan of Marshall Hall, or that of Sylvester. This latter method consists of the alternate extreme elevation and depression of the arms, the child being in the sitting posture.

246. **Umbilical Hemorrhage.**—A very critical—indeed, usually fatal—hemorrhage takes place from the umbilicus of the child in some cases. It may occur from the third to the twentieth day after birth. It has something to do with the fall of the funis, but may set in before its detachment. The etiology of this bleeding is not yet clear. It is owing to the incomplete closure of the vessels; but the question is, what hinders the proper occlusion of these vessels? There is some deep constitutional cause—some blood defect—deficiency of fibrine probably—at the bottom of it. Jaundice is frequently present in such cases, and purpurous spots are often observed. Hepatic malformations and deficiencies have existed in numerous instances, such as absence of gall ducts, imperforation of the ductus com. chol., whether from adhesion,

indurated bile, or organized closure. The bleeding may indicate the hemorrhagic diathesis. Males seem rather more liable to it than the other sex. Dr. R. Peel Ritchie published an excellent paper on this subject, from which useful information may be gleaned by the student, in the Edin. Med. Jour., June, 1868.

247. **Treatment.**—The bleeding must be arrested by astringents, such as ferri perchloridum, burnt alum, or tannin. These are often quite unavailing. If so, the actual cautery may be used, or the ligature. This latter is thus applied: Render abdomen prominent by a pillow beneath the back of the child. Then introduce a hare-lip pin through the integument at the base of the navel. With a loop of thread under this, the skin, etc., is raised, and another pin is introduced at right angles to the first, and under it. We then twist the thread round the pins in the figure of 8 style, and afterward a strong waxed thread is brought round the base of the umbilicus. The eschar formed should not be interfered with, although the pins may be removed in a few days. The ligature sometimes succeeds in stemming the bleeding, but the children may perish notwithstanding. In fact, there are constitutional defects sufficient in many instances to kill, apart from the hemorrhage. These defects in the infant there is no time to combat with remedies. Another method, and which has achieved success, is by means of plaster of Paris. The navel is filled with this in a liquid condition, and when it solidifies it is retained, and arrests the discharge mechanically, and by compression. Pressure may also be applied by means of collodion, and compresses graduated. A compress may be made with matico leaves, or with a thick paste of tannin and gum acacia. This latter is a remedy of my own, and has succeeded, but in a case where there seemed to be no diathetic drawback. "Prevention is better than cure" is an aphorism true both in regard to moral and physical ills, and it tenders a useful hint to us here. We meet with a case of umbilical hemorrhage, say, in a certain family. Well, have any of the offspring previously suffered from the same, and what is the state of the mother's health? Is she anæmic, leucocythemic, or does she suffer from remediable disease of any of the blood glands? If so, we may be able to improve her condition, and consequently that of her future children. As we diminish the number of syphilitic children by combating that disorder in the parents, so in like manner may we lessen the roll (happily not so long a one) of those infants who suffer and perish from the navel flux. Iron is a great blood-improving remedy, and much alterative benefit is conferred by iodide and bromide of potassium, along with the chalybeate medicines.

248. **Imperforate Anus, Blind Colon, etc.**—Sometimes children are born without any anal aperture. The malformation is deemed very rare, but we have met with not a few cases: The rectum usually ends in a *cul de sac*, from 1½ to 2 inches above the external surface. The last case which occurred in my own practice was a somewhat rare one. The bowel terminated in a *cul de sac* about the usual distance up, but there was an anal aperture about three-quarters of an inch deep. It is rare to find the rectum terminating in a sac, and at the same time an anal orifice. Sometimes the gut communicates with the bladder, and meconium passes out with the urine; at other times, and in the case of females, there is a cloacal communication between the bowel and vagina. Again, the rectum is found to open and terminate in the urethra.

249. **Symptoms.**—There is usually, after a day or two, abdominal pain, tenderness, and distension, and vomiting sets in. In my last case,

vomiting of the liquid food began twenty-four hours after birth, and continued until death. The child survived only fifty-two hours, peritonitis having set in. Some children have lived for a few weeks; and there is a case, reported by Dr. Little to the Edinburgh Obstetrical Society (see Edin. Med. Jour., March, 1867,) where the child lived to the extraordinary period of fourteen months. The infant micturated, but never passed fæces, there being only some sebaceous-looking material discharged by the vagina. It was reduced to a skeleton, and the belly was hard and swollen, the circumference round the navel being 24 inches. No opening could be detected from the vagina into the bowel, and no other canal through which fæces could possibly pass. It was brought to Dr. Little from the coast of Coromandel, and no surgeon had a chance of operating upon it. This is the most unique and astonishing case on record. Possibly some little communication existed between the bowel and vagina, admitting of the outlet of a little fluid fæces. It is hardly possible to conceive of it surviving so long without this.

Treatment.—We must endeavor to cut our way cautiously to the bowel, then draw this down, and stitch it to the edge of the artificial opening. Gentle dilatation by bougies may be carried on occasionally, in order to keep the orifice (which has a great tendency to close) open. Sometimes the bowel retracts, and there is a deficiency of mucous membrane; and thus an open canal cannot be maintained. When the bowel terminates too far up to be stitched down at the normal site, an opening may be made over the sigmoid flexure.

250. **Spina Bifida—Hydro-Rachitis Spinosa.**—We prefer noticing this abnormality here also, because, like the foregoing, treatment, to be of service (which it rarely, however, is in such cases,) must not be long delayed after birth. In this abnormality we have a fluctuating tumor in some part of the spine, consisting of watery fluid contained within the sheath of the spinal marrow. Several of the vertebræ are also wanting. A common site of this tumor is the lumbar region; at other times it is found in the cervical region. When the child cries, an impulse is given to the tumor, and pressure upon it sometimes occasions convulsions. Hydrocephalus often co-exist with these tumors, and death usually takes place from convulsions. Tetanus has sometimes supervened, probably from inflammation attacking the cord. Sometimes women give birth to these cases successively.

Treatment.—Pressure has been tried, and tapping, with injections of iodine; but these methods have rarely been successful. Inflammation of the nerve-centres is apt to follow, or violent convulsions. A better plan is that suggested by Sir James Simpson, as follows: Cut out an elliptical portion of the tumor, by means of two semi-lunar incisions in its long axis, and on each side of the middle line, and leave on each side sufficient skin to cover the opening into the spinal canal. Dissect off the lining membrane of the portion left, down to the level of the spinal canal, and close the incision by the interrupted suture.

The preventive treatment of this and other errors of deficiency will be found in the chapter devoted to "Monstrosities," where other abnormalities are also treated of.

CHAPTER XX.

CLASS II. UNNATURAL LABOR.—ORDER I. TEDIOUS LABOR.

251. In **Tedious Labor** the head presents, and labor is terminated without resorting to operative interference; but the period extends beyond twenty-four hours, owing to causes affecting the first stage principally. The chief evil of a protracted first stage is that of maternal fatigue, the woman being thereby rendered less able to meet the exactions of the second stage. The secondary or voluntary forces are thereby sapped and enfeebled, and if they come into play, it is with greatly impaired vigor. Denman, Churchill, and others do not view delay in the first stage as injurious either to the mother or the child; but while that may hold true in reference to the latter, it is perhaps less so in regard to the former. Undue delay in the second stage, however, is now widely recognized by the mass of accoucheurs as a cause of mortality. The causes of tedious labor are numerous. Some pertain to the uterus itself; others are constitutional; and, indeed, the latter often occasion the former.

We shall enumerate them. (1.) Weakness of the uterine force. (2.) Wrongly directed uterine force. (3.) Inadequacy of the secondary, expiratory, or voluntary force. (4.) Rigidity of the os and cervix uteri. (5.) Redundancy of the liquor amnii. (6.) Premature rupture of the bag of membranes. (7.) Non-formation of the membranous bag.

252. (1.) **Feeble Action of the Uterus.**—This may spring from a variety of causes, such as a congested or inflammatory condition of the uterus itself, previous ulceration of the os and cervix leading to induration; organic disease of the organ, or fibrous tumors. Then various constitutional states, such as anæmia, scrofula, the rheumatic and gouty diathesis, chronic dyspepsia, chronic diarrhœa, and dysentery. Women suffering from general debility, or depression of spirit, and those of a highly emotional nature, are prone to this kind of labor. It has been observed that females who have married late, and are thus pretty well advanced in years before they have become pregnant, are also somewhat liable to it. An indolent and luxuriant life predisposes to it; and the same is true of menorrhagia, and other diseases marked by fluxes which undermine the strength. Primiparæ, too, and women who have had large families, and who may have suffered much from leucorrhœa, often help to swell the list.

Symptoms.—The woman may suffer a good deal from fatigue, but there is rarely any feverishness or other bad symptom. The pains may come pretty regularly, but they are feeble, and do not influence the os much, and tardy progress in this way is made. Sometimes there is a long and uncertain interval between the pains, and they are of a griping, spasmodic character. In the rheumatic and gouty they are particularly so, and intolerably sharp and painful.

253. **Treatment.**—The indications here are to sustain the strength and cheer the spirit of the woman; also to stimulate the uterus by gentle means, in the first instance at least. Warm drinks may be given, con-

sisting of gruel, or beef-tea, and a little weak negus. If the bowels are costive, a dose of castor oil will be very suitable, nay, called for; and besides clearing out the rectum, it may increase the uterine pains. In some cases, such as where the woman has lost sleep for several nights, owing to the annoying but almost useless pains, it may be necessary to secure both sleep and a rest to the uterus by an opiate given in the form of suppository. We have seen a draught such as the following help in the first stage: Borax 40 grains: Tinct. Cannab. Ind., and Liq. Morph., of each 15 minims; Aq. Cinnam, 1 ounce. There is here a combination of uterine stimulants with a relaxant; and although the latter theoretically antagonizes the former, yet we have seen good done by the mixture. Borax is not a powerful oxytoxic; if it were we would not administer it in presence of an undilated os. The service got from this draught is, a speedier dilatation of the os, and more regular and stronger pains. When the door of the uterus is thrown open, when the first stage is terminated, and the uterus still continues recalcitrant, we may resort to the (yet) peerless uterine stimulant, ergot. Give a drachm or so of good liquor, and it will rarely fail, in the course of fifteen or twenty minutes, to rouse the unwilling womb to more vigorous action.

254. **Disadvantages and Risks of Ergot.**—While recommending ergot, it will be convenient to notice here some of its demerits. It may affect adversely both mother and child. As regards the former, it may occasion gastric pain, vomiting, and delirium, or even coma and insensibility; but we don't find this happen often. We have given it very often now, and we cannot recall any instance where it excited anything beyond a little stomachic pain, vomiting, and enhanced uterine pain. Ergot also, without doubt, conduces often to irregular contraction of the uterus. It increases the force of the contractions, but these latter are sometimes partial. Thus, incarceration of the placenta may result. In reference to the child, we find that the intensity of the uterine contractions impedes the utero-placental circulation. There is likewise an influence exerted on its vascular and nervous system. Certain it is that not a few children are born dead after large doses have been given to the mother, and others are born in a cyanotic, semi-asphyxiated condition. We have seen death result in several cases, and this cerulean hue in others, where the ergot, though given in pretty large doses, did not produce spastic contraction. This would favor the view of a specific influence on the child. There is always considerable risk to the child, then, when the delivery is not pretty early affected after giving the ergot, say from one to two hours.

255. **When Ergot should not be given.**—Do not give the ergot where there is a rigid or undilatable os, or in cases of mal-presentation or deformed pelvis; in fact, where there is any impediment or obstruction to labor in the passages. We would not give it either where the presentation could not be made out. It is obvious that in first cases it is rarely suitable, the parts being less yielding than in multiparæ. In presence of head symptoms ergot is also inadmissible. But we must now resume the treatment of feeble uterine action. There is a method that may be tried, even before giving ergot, and which was first proposed by Ritzen about twenty-five years ago. The patient being placed on her back, we place our hands on the sides and fundus of the uterus, and make firm and downward pressure in the axis of the brim at the beginning of each pain. We question whether this method should come much into vogue however, as, if not cautiously done, we might injure the uterus, and

favor the production of metritis. Of course, it should not be done unless the passages are ample. We would favor the employment of moderate pressure, and a little friction from above downward.

256. Galvanism was proposed by Dr. Radford of Manchester in this form of labor, among others; but those who have tried it do not seem to have got much benefit from it. Dry-cupping to the sacrum has been tried; and Kiwisch highly recommends the water douche. We have seen the application of mustard over the abdomen help; at other times, hot fomentations. A large piece of spongio-piline soaked in hot water and laid over the abdomen, on which has been previously rubbed a little extract of belladonna, or of tinct. opii., seems to relieve in the case of the gouty, and where the pains are spasmodic; at the same time, the heat facilitates the pains. Some authors recommend bleeding in the case of plethoric females, and where there is an engorged condition of the uterus itself. We are of those who believe that the parturient time is a bad one for venesection. When there is very irregular uterine contraction, we get some benefit from the administration of chloroform. The phrophylactic treatment in these cases should be carefully attended to, when it is in our power. For instance, the gouty and rheumatic diathesis, anæmia, debility, and inflammatory or other conditions of the uterus, should be combated by the fit remedies.

257. (2.) **Obliquity of the Uterus—Wrongly Directed Force.**—When the long axis of the uterus diverges from that of the pelvic brim, as happens sometimes in females with relaxed abdominal walls and a pendulous abdomen, and in others, perhaps, from lying too much in one particular position during pregnancy, the head of the fœtus may be misdirected during the pains. If it be thus made to depart in any direction from the pelvic curve, some delay will be occasioned. Usually, however, no great obstacle to labor is caused by this. On making our examination, we may detect the os pointing too much toward the sacrum (this is the case usually in pendulous belly), or it may be directed too much to one or other side. It (that is, the os) is not often anteverted.

Treatment.—In retroversion of the os, or, in other words, anteversion of the fundus, the chief thing is to make the woman take her pains for a time on her back, and the abdomen, if need be, may be supported by a binder. In extreme cases we would adopt the method of Baudelocque, viz., raising the abdomen with one hand (or getting the nurse to do it), while with a finger or two of the other the os is hooked, brought forward, and maintained in that position during several pains.

(3.) **Inadequacy of the Voluntary Force.**—The secondary forces are frequently rendered less efficient owing to dyspnœa arising from pulmonary or cardiac disease, or aneurism. Abdominal dropsy, too, necessarily impedes these.

258. (4.) **Rigidity of Os and Cervix.**—The expansion of the os is sometimes a tardy process. There are two kinds of slowly expanding os. *One is thin and hard; the other thick, œdematous, and soft.* Mark well that this soft one is just as slow to dilate as the other (or thin and hard one), because it might be confounded with the soft condition of the os; which invariably takes place before it dilates, and into which state even the "thin and rigid cervix must pass."

Causes of Rigidity.—The induration and want of dilatability are usually due to inflammatory action in the cervix, to ulceration, and a preternatural tenseness of the muscular fibres, with absence of the lubricating and softening mucoid secretion. Some cases are due to simple spasm. Thrombus of the cervix, arising from inflammatory hypertrophy, is also a cause, and cancerous deposit.

Treatment.—This of course will vary as the causes. We may try chloroform first; this rarely fails to accelerate dilatation. Tartarated antimony has its advocates, and it is often of service, but the anæsthetic has almost superseded it. At the same time it is in many instances wonderfully efficient. Half a grain may be given; and if nausea be occasioned, but more especially emesis, then softening and dilatation are likely to follow. Chloroform, however, has our own preference, for by the relief to pain which it secures, the woman is more able to employ the potent factor of voluntary aid. Benefit will be gained at times by inserting a morphia suppository into the rectum. The warm sitz bath is of great utility, as also sitting over the steam of warm water. Bleeding, especially in plethoric females, has its advocates, but we do not care to resort to it.

The arguments against it are these: The woman always loses some blood after delivery (from the seat of placental insertion). It may be a moderate amount; but, on the other hand, it may be a truly fearful quantity, and at least we can never foresee the extent of it. Well, if it should be very profuse, and we have happened to drain her also during labor, her chances of rallying will be much diminished. Nay, the post-partum bleeding may then be sufficient to destroy her. This bleeding from the uterine vessels, then, we will always keep in mind when we ponder over the propriety of opening another vessel; and the oftener it sways us over to the side of moderation, or even abstinence, the better. We should specially exhaust the other relaxant means before resorting to the lancet.

259. Belladonna, topically applied, has been praised by some, but we never found it of much use here. (The injection of atropine ($\frac{1}{40}$th gr. or so) into the cervix has been recently recommended.) We can relax the sphincter of the eye infallibly by means of this drug, but not so the os uteri. A tobacco enema has been tried, but owing to its depressing influence, we should not care to use it. The air-bag is an efficient means of dilatation, and ought to be kept in mind. Manual dilatation, that is, gentle rubbing of the os with the well-belarded finger, yields excellent results in some cases. This is a plan strongly condemned by some authors, who seem to shudder at the bare mention of the thing. Especially is it held in abhorrence by many of the Irish school, and not a few able men in London. We have never seen any harm accruing from the plan; and as we have, on the contrary, witnessed much good, we certainly recommend it. The practice is sanctioned by the following able quartette of obstetric authors, viz., Smellie and Simpson, Hamilton and Burns. In carrying out the plan, let there be no rude tearing at the os, but gentle rubbing with the greased finger from time to time.

260. **Extreme and Persistent Cases.**—There are some cases of rigidity (due sometimes to malignant disease, at other times to a peculiar hardness of the muscular fibres, or a cartilaginous condition of the os) which cannot be overcome by any of the afore-mentioned means. The pains, too, may have become powerful, and of a second-stage character, and the patient may be getting into a state of exhaustion. Moreover, there may be a risk of the uterus rupturing, or even of the cervix being torn away, as has in rare instances occurred. In such extreme cases, resort must be had to incision. This is done with a probe-pointed bistoury, carefully applied, or by means of probe-pointed scissors. Four cuts

should be made, about ¾ of inch long, one at each side, and the others anteriorly and posteriorly. These latter should be cautiously done. This operation is not now viewed so serious as it was wont to be; indeed, its harmlessness is almost established. It has been long done in many parts of Germany without bad results, and Prof. Edward Martin of Berlin recommends it warmly, and testifies to the good done by it. He operate in about 1 case out of every 60. He thinks it best suited for the thin and hard os. If the os do not dilate thoroughly even after these incisions, we might further it by a cautious use of the air-dilator. It does not appear that there is much risk of an extension of the cut. After delivery the vagina should be washed out daily with warm water, to which is added a few drops of carbolic acid or a little Potass. Permang.

261. (5.) **Excess of Liquor Amnii.**—In some cases the amount of fluid is enormous, and gushes away like a torrent. This excess may be due to an inflamed state of the amnion, and it is frequently associated with morbid states of the fœtus. We have seen some hydrocephalic cases where there was a great redundancy of liquor. On the other hand, it is quite consistent both with maternal and fœtal health. The strength of the pains is usually impaired; and if the labor be thereby retarded, we must rupture the membranes, and permit the escape of the fluid. A large basin should be placed before the vulva to catch the waters, otherwise the bed may be uncomfortably drenched.

(6.) **Preternatural Toughness of the Membranes.**—The membranes are sometimes so tough that they do not give way when they should—viz., at the termination of the first stage. They do not necessarily cause delay by remaining entire after this, but if they do so, they should be ruptured at once. Their entirety after the second stage is entered upon, while seldom of much use, is often of much harm, as labor is thereby retarded.

262. (7.) **Non-Formation of Bag of "Waters."**—Cases sometimes occur where there is abundance of liquor amnii, and yet the bag of waters does not form, owing to the head being applied too closely to the lower zone of the uterus. We are thus in the same plight as we would be were there no liquor amnii at all. The head has thus to do the work of dilatation, instead of the more suitable wedge of the bag of liquor; and it does it more slowly in general, and with more pain to the mother.

If we cannot push up the head, and permit the fluid to come down, we had better rupture the membranes. Under chloroform there is no difficulty, as a rule, in pushing up the head.

(8.) **Too Early Discharge of the Amniotic Liquor** retards labor in the same way as non-formation of the bag. It may get prematurely evacuated, owing to weakness of the membranes, or rupture during examination, etc.—a lesson for us to be cautious in our examination.

CHAPTER XXI.

CLASS II. UNNATURAL LABOR.—ORDER II. POWERLESS LABOR.

263. The labor is retarded in the second stage owing to weakness or absence of the pains, due to feebleness of constitution or of the uterus, mental emotion, etc. Delicate females, with their first children, especially

if the first stage have been unduly extended, are liable to a break-down of the uterine powers. We have seen such cases, and where it was impossible, by the usual means, to recall the pains. Emotion operates most markedly in some instances. The pains will leave some females at once on the entrance of a strange doctor. We have patients whose pains are suspended by our own presence, and where, did we not remain in an adjoining room, the uterine contractions might remain in abeyance altogether. If one meet with a sensitive female like this, he should leave the room until the labor is far advanced, that is, after making out that the presentation is all right.

Rheumatism of the uterus may prevent the proper contraction of the muscular fibres, and lead to powerless labor. But most cases will deepen into this if assistance be too long delayed; but, as we shall see when speaking of treatment, we now interfere at an earlier period.

264. **Symptoms.**—The second stage may go on for a good many hours—ten or twelve, or more—without the development of any untoward symptoms; but gradually the pains begin to lose strength; they recur less frequently, and are less regular in their advent. From having recurred every few minutes, they may remain away for an hour, or even longer. The woman becomes restless, and tosses about from place to place; the skin grows hot, and the pulse increases in frequency very much, going as high as 120 to 140. Rigors of a severe description, and vomiting of bile also occur. The tongue gets dry and coated with fur, and sordes may accumulate on the teeth. The vagina and os become hot and tender, and a glairy and dark discharge takes the place of the natural secretion of those parts. The mind becomes haunted alternately by dread and despondency, terror and gloom. There may be pain over the bladder, from the impossibility of emptying it, owing to the pressure of the head of the child. If delivery be not affected, these symptoms may be much aggravated. The pulse becomes more feeble, as well as rapid; the abdomen grows tender; the vomited matter may be like coffee-grounds; clammy perspiration covers the skin, and a low delirium sets in, and proves the harbinger of death. In such cases, the way is paved for sloughing of parts and painful disorders, such as vesico-vaginal fistula.

265. **Treatment.**—The foregoing train of ugly symptoms is rarely witnessed now, unless it may be in sequestered parts of the country, where skilled assistance is to be obtained but tardily, or in the hands of gentlemen of a sadly conservative structure of mind, who swear blindly by the apothegm, "a meddlesome midwifery is bad." The number of these is happily now much smaller; and good will it be for both mothers and children when, like the mastodon, they become extinct altogether. The doctrine of these destructive conservatives is well embodied in the following sentence by Dr. Collins: "Let it be carefully recollected," says he, "that so long as the head advances ever so slowly, the patient's pulse continues good, the abdomen free of pain or pressure, and no obstruction to the removal of the urine exists, interference should not be attempted, unless the child be dead." Dr. Murphy, in the second edition of his work, expresses similar views. He says that, "when the head is passing through the cavity of the pelvis, interference with the forceps is not called for, because of the time occupied, but rather because of the special conditions of the case. The time occupied in a labor is, *seipso*, no justification of instruments." ("Midwifery," p. 280.) A protracted labor, then (in the second stage), according to these authorities, is just a

call for the exercise of the virtue of forbearance; the treatment is patience, and not the forceps, as a rule. The instrument steps in only when pathological conditions are set up by the prolongation of the labor, in melancholy oblivion of the aphorism, "prevention is better than cure."

266. We firmly believe that this ultra-timid system has led to a deal of mischief in its too protracted day. Countless children have been lost through it; and innumerable mothers rendered a burden to themselves and to friends. Vesico-vaginal cases have sprung from it beyond number. It is curious how gentlemen, when they knew that serious symptoms (we should rather say pathological states) were as sure to arise as to-morrow's sun, did not dream of preventing these by a more early assistance of the natural powers. What could have been the reason, what the explanation of their cruel procrastination? They must have viewed the forceps as a dangerous thing; that is their only and poor justification. If they did so, a film was on their eyes, else would they have seen that the forceps was no destructive monster, but a harmless thing—poor parturient woman's best friend in the hour of suffering, and when strength is small. Happily, we know better at the present day; there is a rapidly growing band sworn to the doctrine of timely intervention, and the representatives of an injurious system of delay become fewer and fewer daily. It is good that such a change of opinion should have come about; for modern woman, in the crowded cities, at least, and encircled with the belongings of an advanced, but somewhat spurious civilization, is not able to bear the tender mercies of the non-intervention school.

267. We are not to let the second stage of labor go on indefinitely, then; we are not to wait for hot vagina, tender abdomen, rigors, vomiting, fever, jactitation, delirium, a bruised and pulpy condition of the soft parts, exhaustion, etc., etc., before interfering. No, we anticipate these, or, we should rather say, avert them.

How long should we allow the Second Stage to proceed without interference?—If the natural powers fail in expelling the child after, say two or three hours' trial in the second stage, there is some defect which requires remedying. If the defect be such that ergot is unsuitable or inadequate, then the "steel fingers" must step in. We are convinced that emphysema has been frequently initiated—nay, that cardiac and head affections have been set up, as well as aggravated when previously existing, by the severe voluntary efforts of an unassisted second stage. The vectis is recommended by some authors, but it is no favorite of ours. You cannot employ it without using the maternal parts as a fulcrum, and thus, in all likelihood, bruising them. Of course, in cases where the forceps could not be applied, and version were impracticable, we would be obliged to resort to perforation. Although, under the care of a practitioner imbued with the more modern views, bad results are likely to occur rarely, we may yet say a word as to the treatment of these. If the parts have suffered contusion from delay and impaction, syringe them frequently with tepid water, and if the discharge be offensive, add Condy or carbolic acid. Abdominal tenderness should be allayed by poultices, by an opiate internally, and by the rectum; and, of course, if metro-peritonitis were threatened, we would increase the opium largely, with the addition of some calomel, and also leech the abdomen. Were pelvic abscess to supervene, it would have to be met by the means detailed further on, when treating of that affection. It ought only to be in outlandish districts—shut out from modern light and proper assistance—that this train of sequelæ, as a rule, should be found.

CHAPTER XXII.

CLASS II. UNNATURAL LABOR.—ORDER III. OBSTRUCTED LABOR.

268. The labor is checked by mechanical obstacles in the passages connected with the soft parts, the obstruction delaying the second stage, and inducing the symptoms of powerless labor.

Some of these obstacles also interfere somewhat with the progress of the first stage. The causes are numerous, and are as follows:

1. Preternatural smallness, or absence, or obstruction of the os.
2. Malignant disease of the uterus.
3. Contracted or undilatable vagina.
4. Pelvic tumors.
5. Enlarged ovaries.
6. Vaginal cystocele.
7. Stone in bladder.
8. Vaginal hernia.
9. Prolapse of rectum.
10. Scybala, or fæces in rectum.
11. Swelling of soft parts.
12. Unruptured and imperforate hymen.
13. Rigidity of perinæum.
14. Tumefaction of labia.

(1.) **Small or Occluded Os.**—There may be congenital contraction of the os, or its narrowed and imperforate state may be due to disease. The cicatrices of previous lacerations may also lead to its contraction. Cases are reported where there was no os at all.

Labor may be much retarded by contracted os, and symptoms of powerless labor set in. In other instances it may yield to vigorous pains before much time has elapsed. As in rigid os, laceration, or even separation of the part, might occur.

Treatment.—If the uterine pains are insufficient to overcome the contraction or agglutination of the os within a reasonable time—that is, before bad symptoms are set up—then we must interfere. Some of the relaxant methods noticed under rigid os may be tried first, and during a pain the finger may be pressed against the contracted part. If these fail in inducing expansion, incision must be resorted to, as in extremely rigid os.

269. (2.) **Cancer of Uterus.**—The induration resulting from cancerous deposit presents a barrier frequently to the descent of the child. Sometimes the os yields without much difficulty to the force of the pains; at other times much resistance is presented, and recourse must be had to incision. Or in some cases we may try version or the forceps before using the knife or scissors, which operative interference may hasten the woman's certainly approaching end. I have incised in one case where the rigidity was so great that neither version nor the forceps were practicable. Labor was facilitated by the procedure, and the fatal termination was not apparently hastened.

(3.) **Narrowing of Vaginal Canal.**—Contraction and induration of the vagina may be due to previous inflammation, suppuration, or laceration, or a congenital defect. In some females, married when forty to forty-five years old, much trouble is occasioned. I have been consulted by several where the vagina was so narrow that proper connection could not be effected until the cartilaginous hardness was softened down by bougies or tents, or cut through with a bistoury. When connection is completed, and conception takes place, much opposition may be offered to the progress of the labor. Steaming and application of lard may help dilatation; but in some cases it may be necessary to incise the strictures with the knife. The tight bands should be cautiously divided, and the utmost care taken not to plunge the knife into adjoining parts. It is only if the head utterly fails to dilate the vagina, and the symptoms of powerless labor are threatening, that we would think of resorting to incision.

270. (4.) **Pelvic Tumors.**—Various growths, fatty, fibrous, or malignant, in different parts of the pelvis, may hinder the progress of labor. If small, the progress of labor may be but little delayed; but if larger, and incompressible, they are likely to prove a serious bar. (See fig. 18.)

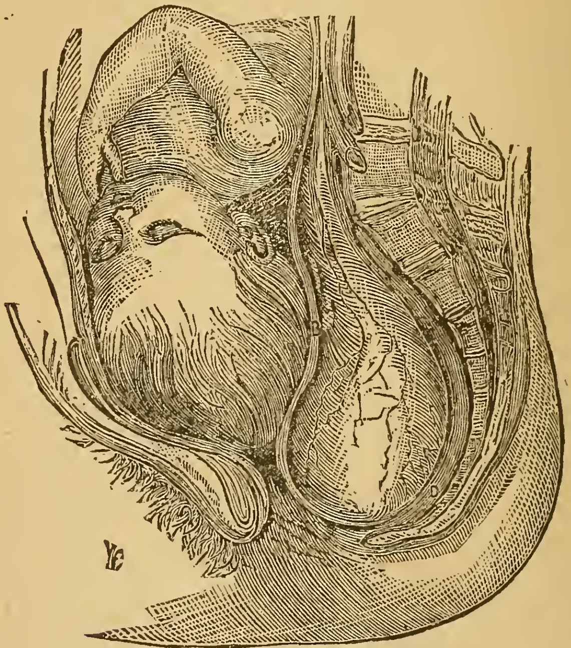

FIG. 18.

The *treatment*—that is, when we find that labor is seriously interfered with—will depend on the site and nature of the growth. It may be a movable one, and capable of being pushed up beyond the brim of the pelvis. If situated pretty high, we will have a better chance of thus putting it for the time out of the way. The free administration of chloroform enables us to do this all the better. If we succeed in placing it above the brim, its maintenance there will be facilitated by placing the female on her elbows and knees (as in Thomas's postural treatment for prolapsed funis) until the head of the fœtus is engaged in the pelvis.

Some of the tumors contain fluid, and may be evacuated by trocar.

Others are too solid to be thus lessened. In some instances the tumor itself may be removed. The head has forced down and separated a polypus; and in others the latter has been removed by the scissors. Cauliflower excresences have been removed also; but the one or two cases of this growth I have seen were so soft as not to be a serious impediment at all. When these growths are such, in respect of consistence, site, and character, that they can neither be compressed, evacuated, incised, or pushed out of the way, we may be compelled to operate on the infant. The forceps may in some cases succeed, in others version. In others, again, we may have to perform the melancholy duty of perforation. In some extreme cases the passages are so completely blocked by tumor that the Cæsarian section has to be undertaken. Where these cases have been left to the natural powers alone, they have often turned out fatal, partly by leading to exhaustion, and partly by the bruising to which the tumors have been subjected during labor.

271. (5.) **Ovarian Tumors.**—Usually ovarian growths are carried up by the uterus into the abdominal cavity; but sometimes, by contracting adhesions, they remain pelvic, and impede labor. Again, if rapidly formed, a cyst will fall down into the recto-vaginal septum and be felt through the posterior vaginal wall, where also the entire ovary may gravitate. An ovary has thus prolapsed during labor. There are two ways in which ovarian enlargement may hinder labor—(1) By altering the long axis of the uterus; and (2) by obstructing the passages. The treatment is shaped a good deal in the same way as in the case of the growths previously noticed. They may be pushed out of the way in some cases; in others the cyst may be opened by trocar; while some, again, may demand forceps, version, or cephalotripsy. We should try to elevate the tumor first; then, if we fail, we may puncture. If the tumor is not thereby reduced, we must either turn, or use the forceps or the perforator, as before said. We do not see how perforation should have been so fatal. If it is carefully done, there should be less risk in a case of this kind than with the forceps, because we thereby reduce the bulk of the child, and thus are less likely to bruise the tumor. We agree with Dr. Barnes, that in such cases it is best to induce premature labor. We believe that this, on the whole, would be the most conservative method, as regards both mother and child, although there are no statistics to show it.

272. (6.) **Vaginal Cystocele.**—Pressure by the head of the fœtus on the fundus of the bladder may cause it to prolapse, especially if the anterior wall of the vagina be prolapsed; but such cases happily are rare. There is a good deal of pain in the direction of the pubis—down-dragging sensation, and almost constant desire to pass water, and inability to do so voluntarily, though some may escape on the recurrence of each pain. The finger will detect a fluctuating tumor occupying the anterior part of the pelvic cavity, and covering, to some extent, the fœtal head. We can push our finger up behind the tumor, but not in front. This tumor has been mistaken for the bag of waters, and even for a hydrocephalic head, and in both cases punctured. These were great blunders, and are beacons to warn. No pelvic tumor in this locality should be punctured until the catheter has been introducd into the bladder, and the water drawn off. A tumor of this kind is a source of more evil than the retardation of labor, for there is some risk of the bladder being ruptured.

The *treatment* consists in the early introduction of a catheter so soon as a fluctuating tumor is detected. A long elastic one may be used, and it should be pointed downward and backward. We should also endeavor to elevate the presenting part during the interval of a pain, when catheterism may be facilitated. If we do not succeed in emptying the bladder, and the labor is rendered impossible owing to the tumor, we may have to tap the bladder through the vagina. This is a serious step, and before thinking of it we must make out that it is imperatively demanded.

Distended bladder, without prolapsus, is often an occasion of retardation. The catheter should be introduced, and the bladder emptied.

273. (7.) **Stone in Bladder.**—Vesical calculi large enough to impede labor are rarely met with. Several cases are reported where vaginal lithotomy was performed; others where the contusion led to sloughing, and vesico-vaginal fistula. There is no resource left but vaginal lithotomy if the labor be rendered impossible, unless the calculus might be pushed up above the brim, and out of the way of the descending head.

(8.) **Vaginal Hernia.**—A loop of bowel may fall down between the vagina and rectum, and impede labor, if impacted with hard fæces. I have met with this, but labor was little retarded. We may be able to replace the gut, and allow the head to come down before it; at other times we may have to use the forceps, but there is some small risk of injuring the bowel.

(9.) **Prolapse of Rectum.**—The rectum may prolapse (rectocele) and impede labor, but rarely to any considerable extent, unless much impacted.

(10.) **Scybala, or Fæces in Rectum.**—This rectal collection, which is by no means a credit to the wearer, may prove an obstacle to the descent of the head, but it is happily not difficult to get rid of by injection, or scoop, if necessary. The removal of this tumor is not a very agreeable task; but if the nurse cannot extirpate it, the doctor had better do so than lose hours of valuable time. When I encounter a swelling of this nature, I administer to the woman both warning and rebuke. Some authors say it is less common among the higher ranks, but sometimes physic is abhorred by those in good station as strongly as by those in humbler spheres.

274 (11.) **Swelling of Soft Parts.**—A general swelling of the soft parts of the pelvis may be occasioned by a protracted detention of the head of the child, causing an impediment to the circulation. As it is an evil likely to grow worse the longer delivery is delayed, we had better resort to the forceps, if the head is making but little progress.

(12.) **Unruptured Hymen.**—Conception may take place although the opening is very small. If this condition of the hymen retard labor—if it does not yield to the pressure of the head—an incision will have to be made. A small one will suffice, and the perinæum should be well supported at the same time, to prevent extension of the cut.

(13.) **Rigidity of Perinæum.**—This condition characterizes primiparæ chiefly, and is sometimes associated with very unyielding coccygeal and sacro-sciatic ligaments. When this state of matters exists, we have difficulty in getting the exploring fingers up to the os, and the vagina seems to encompass them like a band of leather. If the parts do not, within reasonable time, soften and dilate, we try steaming, lard, and perhaps antimony or chloroform.

275. We have seen good done by morphia suppositories. Pessaries of lard, wax, and palm oil, with a little belladonna, help somewhat. The chloroform is undoubtedly of great value here, because it relaxes the perinæal muscles. We have got more benefit from it in this rigidity

than in indurated os, where, however, as before noticed, it does good in many cases. The modern practitioner is a much happier man (or ought to be) in presence of this rigidity than his ancestors, for by means of his anæsthetics he drives the induration away.

There is one caution to be given in such cases—that is, not to be applying the *vis a tergo* in the shape of ergot or strong stimulation. We do not want tremendous pains in rigid perinæum for fear of laceration. Distension must precede strong propulsion. We have seen ergot in such a case occasion a tear back to the sphincter ani. Instead, then, of increasing the pains, one's duty is to watch the perinæum, and support it carefully. Hamilton, in some of these cases, held it until he was exhausted, as greatly almost as he was in some cases of craniotomy, where he afterward had to be carried home in his sedan chair.

(14.) **Tumefaction of Labia.**—This condition may be due to infiltration of serum, or sanguineous engorgement, arising from impeded circulation. If it threatens to hinder the exit of the head seriously, it must be opened. If there is much bleeding, it may be arrested by perchloride of iron or compression.

CHAPTER XXIII.

CLASS II. UNNATURAL LABOR.—ORDER IV. DEFORMED PELVIS.

276. Labor is obstructed in the second stage by pelvic deformity, and rendered impossible without aid, or even impracticable by the natural way. The symptoms are those of powerless labor.

The most serious instances of this order are those where the brim is contracted, or where osseous tumors are developed on the sacrum. Oblique distortions especially interfere seriously as a rule, and render perforation necessary. We must just judge each case on its own merits. Some may be delivered by the forceps, others may require craniotomy, while graver cases occur in which it is impracticable to deliver even a mutilated fœtus, and where the abdominal incision must be resorted to.

In some instances, a living child may come through a somewhat seriously contracted pelvis, owing to its being small, and the cranial bones not very well ossified; therefore, deformity *per se* will not infallibly necessitate extreme measures. There are few experienced practitioners who have not known of instances where craniotomy has been performed, and yet where, on a future occasion, a living child has passed through the same pelvis safely, and without even the use of the forceps.

Pelvic Diameters through which a Living Child of average size may pass.—There is a good deal of contrariety among obstetricians with respect to this point. Some say that a living child at the full time cannot pass through a smaller (antero-posterior) diameter than 3 inches, while others go half an inch higher and lower; 3 to 3½ inches would appear to be the limit, and under this, craniotomy. Even with a small conjugate diameter like this there will be no little delay, and necessity for the forceps.

277. **Diameter through which a Fœtus may be Extracted Piecemeal.**—There is the same discrepancy here in regard to the smallest

diameter through which the broken-up fœtus can be drawn. All we can say is this: that there are cases reported where the mangled fœtus has been dragged through a conjugate of 1½ inches. But then is it safe to do this? We think not. The general opinion would seem to be that perforation is demanded where the antero-posterior is under 2¼ to 3 inches, and Cæsarian section when it is under 1½ inches. These operations we shall describe further on.

Symptoms in Obstructed Labor.—The symptoms were said to be those of powerless labor, previously described; but there are some differences to be noticed. The head does not get down into the pelvis, and may jam the uterus against the brim; or if it does so for a certain way, it may crush it against the hard part of a tumor, and thus inflammation and sloughing, or even rupture of the uterus, may be occasioned. The vagina may be contused also, and inflammation and sloughing ensue, leading, perhaps, to an opening into the bladder or rectum. It is such cases, when allowed to go on, that furnish those painful affections. such as vesico-vaginal fistula, which happily, however, are no longer a source of opprobrium to the doctor.

The child may also suffer from the compression of its head, the cranial bones may be fractured, and sloughing of the scalp may set in. It is a moot-point whether the foundation of future cerebral disease, leading, it may be, to mental defects, is not laid by this compression of the fœtal head.

Treatment of Obstructed Labor.—We must judge each case, as before said, on its own merits. If the obstruction is not great, version, or the forceps, may suffice; and the former will enable us to bring a child through a somewhat narrower brim than if the forceps were used. If it is serious, craniotomy (or cephalotripsy, to those who prefer it), or the Cæsarian section, may be necessitated.

There will likely be much care and attention required in the after-treatment.

CHAPTER XXIV.

OBSTETRIC OPERATIONS.—I. VERSION OR TURNING.

278. This is the operation by which one presentation is changed for another more suitable one, and it has been known since the time of Hippocrates. Turning is a term also applied by some to the correction of mal-positions, but not with strict propriety.

It is an operation by which we are enabled, in many cases, to save both mother and child, the forceps being impracticable, and the only other alternative being craniotomy. As we have said elsewhere, the forceps is one of the most invaluable discoveries ever yet made in connection with our art, but yet it is doubtful whether its achievements have been greater than those which the hand, soft as the maternal parts, is capable of effecting. Paré, who taught us its great value (since that time the limits of its utility and power have been much extended), certainly merits the praise awarded to the greater obstetric lights; and as Simpson's name is recalled to us when we administer chloroform, so may we think of Paré as we go in quest of a foot, and in bringing it successfully down, mayhap save the lives of both mother and child.

Some statistics are given showing the value of the operation, but we know none that are satisfactory. One reason is, that we are not all agreed as to the conditions demanding it; some, for example, recommending it in cases of contracted brim, others using the forceps instead. Another reason is, that the condition requiring it, in many cases, killed the patient, and therefore the operation could not fitly be blamed.

279. From the statistics given by Dr. Churchill in his admirable book, it would appear that the operation was fatal to the mother in the proportion of 1 in 14, and to the child in the ratio of 1 in 3. This would indicate it to be a rather serious operation (and, indeed, authors usually represent it as such); but if we reflect that, as before said, the complication or condition requiring the operation had, in many cases, to do more, or altogether, with the fatal result, we will not view it as so very grave. Our own experience now in this operation, not very small, leads us to this conclusion; and we subjoin a table in order to show the results in the cases which we have had to deal with:

Cause of Operation.	No. of Cases.	Mother Died.	Children Died.
Placenta prævia	8	......	2
Transverse presentations............	19	1	5
Convulsions.........................	3	......	1
Contracted pelvic brim..............	38	......	3
Prolapse of funis	3	......	......

This table shows hardly 2 per cent of deaths in the case of the mother, and only 1 in 7 as regards the child. In some of the cases there was flooding, and in others a tetanic uterus to deal with, and no little difficulty alike in getting the hand up and the child delivered. The single death was a case of arm presentation, and the woman was subjected to much rough usage before we arrived. She succumbed to inflammation and sloughing. A report of it will be found in the Lancet, 1870.

280. It is usual to divide version into two orders, podalic and cephalic. Let us notice the podalic first.

Podalic Version.—This is usually the best method in placenta prævia, in transverse presentations, or cross-births generally, in convulsions, in prolapse of the cord, in ruptured uterus, and it might also be had recourse to in case of sudden death of the mother during labor, instead of incising the abdomen. It is a strongly controverted point, whether or not in cases of pelvic deformity, especially contracted brim, version should not be tried instead of the long forceps, or even craniotomy. This was recommended by Ould, Burton, Denman, and Sir James Simpson. We have probably substituted turning for the long forceps as often as most men of our years, and are happy to say, with most gratifying success. We have now on several occasions succeeded in delivering by turning in such cases, where the high forceps operation completely failed, and where perforation was the only other alternative. Some of these cases we have reported: see Edin. Med. Jour. for March, 1867. The grounds for commending it are as follow: (1.) The bi-mastoid diameter is at least half an inch less than the bi-parietal, and, in turning, it is the bi-mastoid which engages the pelvis first. (2.) The head is not so compressible under the uterine expulsive force as it is under the traction we employ in turning. When the vertex does not enter the pelvis easily, the head is bulged out, and its bi-parietal diameter is increased; but when, as in turning, the bi-mastoid diameter enters first, the bi-parietal, under the traction we apply, does not widen out, but becomes compressed. Bodies can sometimes be more readily drawn through an opening or canal, than pushed through it. (3.) The bi-temporal diameter is about half an inch less than the bi-parietal. In vertex presentations the chin lies on the sternum, and therefore the vertex and the bi-parietal part of the head enters the brim first—that is, with the larger diameter (the bi-parietal) opposed to the antero-posterior. In turning, on the contrary, the chin is extended, and the bi-parietal diameter enters the widest part of the pelvis. (4.) Version may be attempted at an earlier period than embryotomy, as a rule; and thus we may spare the woman the risks of delay.

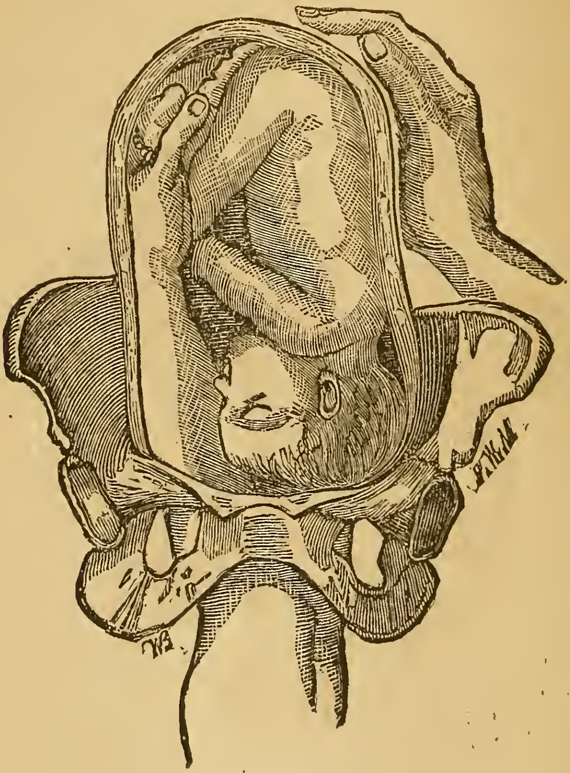

Fig. 19.

The cases suitable for this line of treatment are where the conjugate diameter is about three inches.

Drawbacks.—(1.) We are apt to lose children in turning from compression of cord, or over-extension of neck; but the former, at least, as we shall notice in describing the method of operating, may in part be avoided. (2.) The traction required may be so great as to contuse the maternal parts seriously. (3.) We may miscalculate the diameters of the pelvis, and, after using strong traction, fail, and have to perforate after all. We have had but seldom to perforate after turning. Despite these disadvantages, we are inclined to join the other great men in recommending it, believing that the good, in well-selected cases, we are able to get from it will outweigh any little evil that may attach to it.

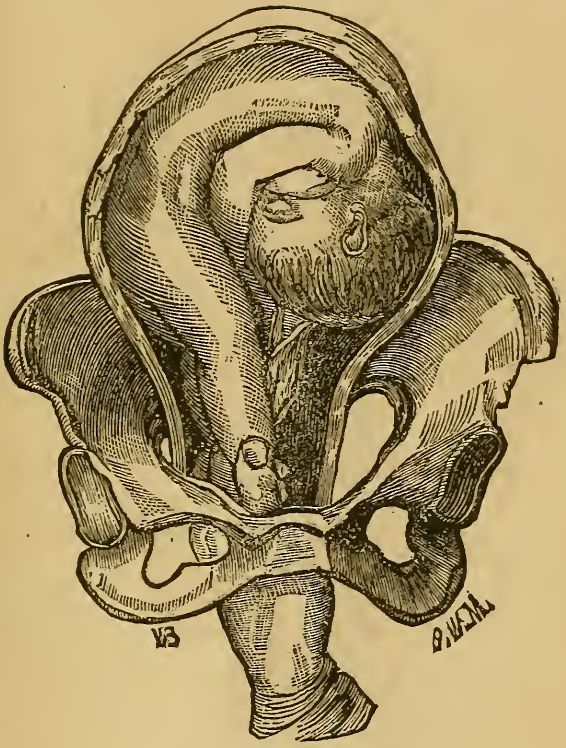

FIG. 20.

281. **Method of Operating in Podalic Version.**—Place the patient on the left-lateral position, with the nates at the edge of the bed, and the knees drawn up toward the abdomen. Make the nurse elevate the right leg a little, or, if you have no reliable nurse, place a cushion below it, and some distance from the vulva. Bare the whole arm, the coat being taken off, to prevent fatigue or compression of the muscles of the arm, and introduce the hand, cone-shaped, and the back of it well besmeared with lard, with a gradual and gentle movement into the vagina. On reaching the os, introduce the hand, with a slow, semi-rotary movement, in the absence of a "pain," not pausing unless the os is rigid,

until the whole hand is within the uterus (Fig. 19). The stimulus of the hand may excite the uterine contractions, and its progress be thus resisted; but chloroform obviates this very much (it is better to have the female well anæsthetized), and favors the relaxation of the os uteri. If the membranes are unruptured, we make the hand ascend as far as possible without breaking them, as this preserves the liquor amnii better, a medium of vast service in this operation. Sir James Simpson was wont to object to this rupturing of the bag high up, on the ground that we might lacerate the edge of the placenta. With all deference, we have always thought that this was a very feeble objection. We can ascertain tolerably well where the placenta is implanted, even before operating, and thus easily avoid it. We have ruptured very often high up, and never so much as scratched the placenta. When we rupture the membranes, our hand comes into contact with the fœtus, and during the onset of a pain we should lay it flat on the child. If we have not previously known the position of the infant—whether abdomino-anterior or dorso-anterior—we must seek for its abdomen, where we we will be sure to find a foot. Sir James Simpson, Dr. Radford, and others, say that we may be content with one leg, the furthest off one being preferable. Well, if there is not much room to work, we may be satisfied with one (the furthest off one); but if we can clutch two, it is much preferable. We say this advisedly, after trying both plans pretty extensively. With one leg only, you will not, as a rule, effect version so readily as with two.

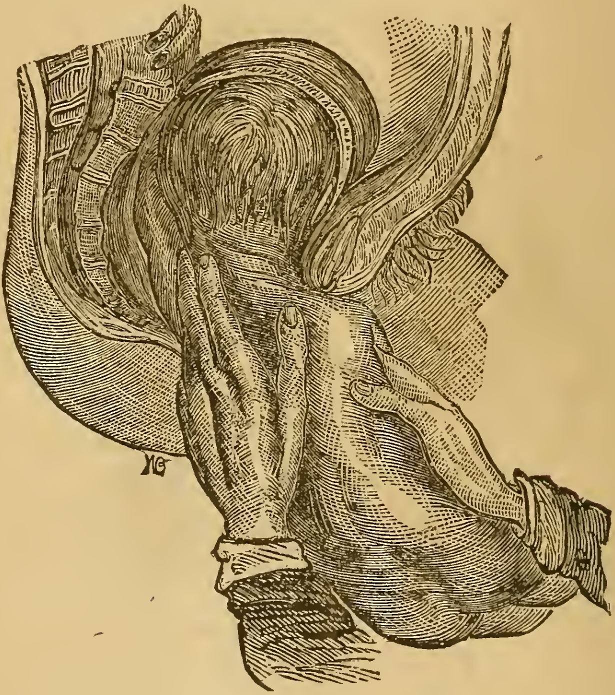

FIG. 21.

282. Those who recommend one only, do so on the ground that, when

the other thigh is up, it dilates the passage more, and thus renders injurious compression of the funis less likely. But this will hardly compensate for the greater difficulty in turning; and we may obviate this compression by drawing the child cautiously down, and relieving the cord as we do so. The ascent of the head may be helped by the external right hand, as also the descent of the breech. There is another plan we have adopted to facilitate the revolution of the child—viz., to push the head up with the thumb of the internal hand as we draw the feet down with the fingers. We cannot do much in this way (the fingers of the same hand exerting force in opposite directions), but a little helps. If a second foot cannot be obtained without much difficulty, we may be content

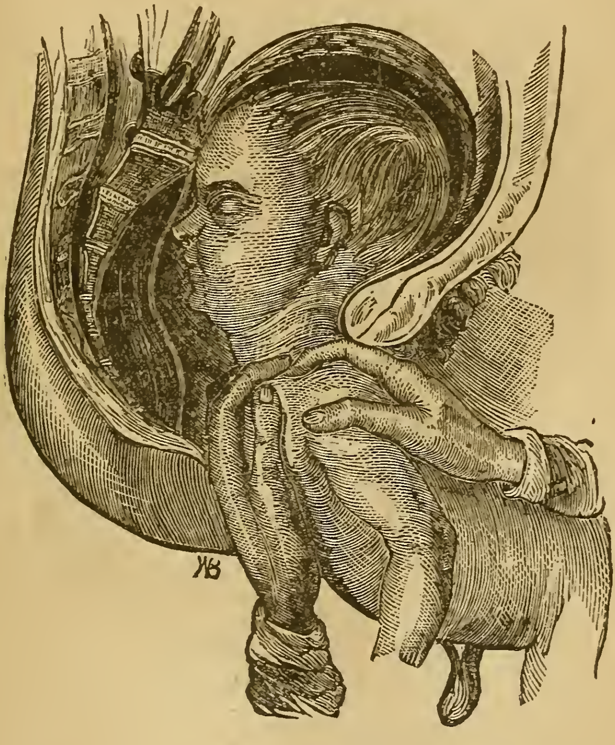

FIG. 22.

with one; but bear in mind that turning cannot be so easily accomplished with one. A piece of tape round the fœtal ankle is useful in extreme cases, where the uterus contracts very strongly. It enables us the more easily to bring down the breech and promote revolution. When the breech is in the pelvis, we should just make very slight traction, assisting the pains a little, and not hurrying delivery. When the umbilicus appears, a fold of the cord should be drawn down, so as to prevent stretching or crushing of its vessels. As these vessels are spiral, stretching is as injurious as compression, and leads in the same way to diminution of their calibre, thus impeding circulation. We should help, if necessary, one shoulder into the hollow of the sacrum, and the other under the arch of the pubis. (See Fig. 21.) The head is thus placed in the most suitable position for its transit through the brim. Help first one and then the other arm down across the chest. The face of the child may be helped into the hollow of the sacrum by placing the left hand on the abdomen and the right hand on the back. (See Fig. 22.) Turn the nape of the neck up under the symphysis pubis as the head is passing the perinæum, and direct the back toward the mons veneris. Aid can be rendered in the delivery of the head, when required, by hooking a finger into the mouth (see Fig. 23), introduced either by the vagina or the rectum. The drawing down of the head, to avoid compression of the cord, should not be unduly delayed.

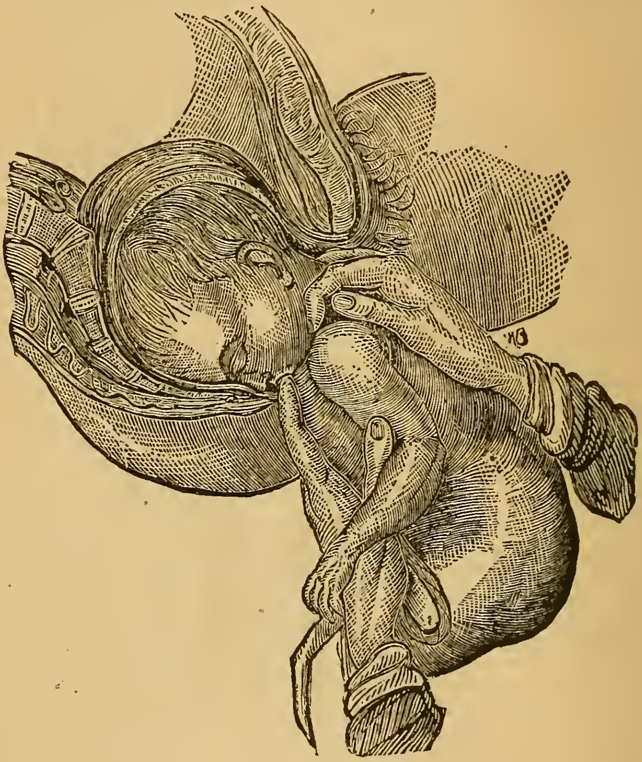

FIG. 23.

In all cases we should see to it that the hand is clean, the nails shortened, and, in regard to the woman, that her bladder and rectum are previously evacuated.

283. **The Hand to be Employed.**—A few remarks under this head may not be amiss. Some recommend the right, others the left. We strongly approve of the left hand in most cases, believing that version can be more easily accomplished by it. In the ordinary position in which the woman is placed, the left hand can be introduced more readily, for the following reasons: (1.) The knuckles of the left hand adapt themselves better to the cavity of the sacrum. (2.) The left hand and

fore-arm form a curve more easily and naturally than the right in correspondence with the passages. (3.) On using the right hand, the knuckles impinge against the pubis, and the hand and fore-arm cannot ascend backward and upward in the direction of the brim without bending the wrist back in an unnatural and restrained degree. (4.) In using the left the right is set free to render important external aid. (5.) The left hand is frequently rather smaller than the right, a thing of great importance in difficult cases.

In cases where the child is lying in the abdomino-anterior position, we may succeed better with the right hand. Especially is this the case where there is not plenty of liquor amnii.

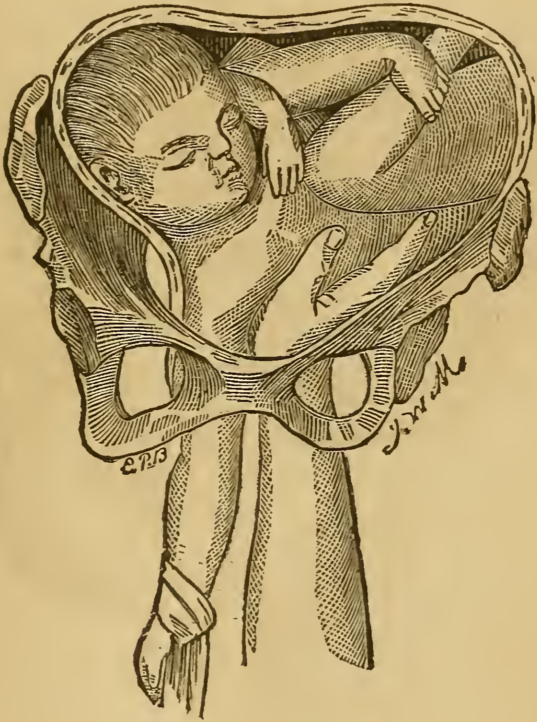

FIG. 24.—Arm Presentation.

The More Difficult Cases of Version.—When there is abundance of liquor amnii, and in multiparous cases, with a roomy pelvis, version is a simple matter; but where the fluid has been long drained away, and the parts have become dry and hot, where, perhaps, also the uterus is tetanically contracted, the case is one of difficulty. Occasionally, indeed, in presence of such circumstances, we will be baffled: or if we attempt it, we run the risk of lacerating the parts—of rupturing the uterus itself. In those extreme cases, a paramount pre-requisite is thorough anæsthesia. This relaxes the spasm, and may enable the hand gradually to ascend and clutch a foot, If chloroform fail, a grain of tartarated antimony may be tried before handing the infant over to the perforator, and the woman to the dangers of craniotomy. We have seen antimony induce the most surprising relaxation in some of these cases.

284. **Combined External and Internal Version; the Bi-polar, or Hicks' Method.**—Dr. Braxton Hicks has originated a novel and very useful mode of version, a full account of which will be found in his monograph on the subject (On Combined External and Internal Version, 1864). The doctor's plan is as follows: Take a case of podalic version, the head presenting. Well, by a finger or two of the left hand, you push up first the head, then the shoulder; while simultaneously, with your right hand externally applied, you bear down the breech. You may thus be able to hook the knee or a foot with a finger or two, and bring them down. The uterus aids the work, especially when the fœtus lies at an angle to the long axis of the womb, in consequence of the well-known bias which it has to bring the long axis of the child in correspondence with, or parallel to, its own. We have noticed this operation at length in an article published in the Edin. Med. Jour. for Nov. 1869. The advantages of this plan are as follows: (1.) You are spared the necessity of introducing the hand within the uterus, a plan which might be fraught with risk, in the way of laceration, inflammation, or septic poisoning. (2.) You may be able to turn in some cases of placenta prævia where the os is too rigid to admit the entire hand.

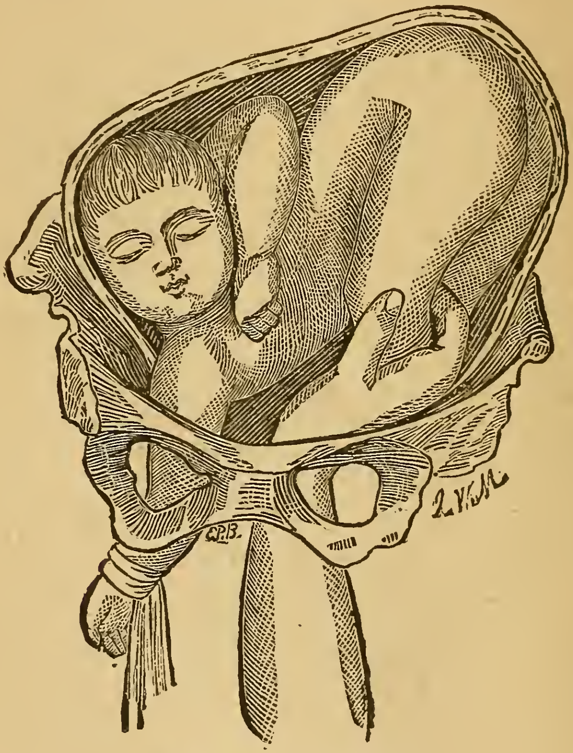

FIG. 25.—Arm Presentation.

(3.) In convulsions (where turning is frequently the best plan), it is of great importance to accomplish delivery with as little peripheral irritation as possible, and Hicks' method implies a smaller amount of handling of the parturient canal than the other. (4.) In cases of co-arctation of the pelvic brim, where version is preferred to the forceps, we are enabled to turn at an earlier period, as we do not require the os to be much dilated; and thus delivery may be effected before the "waters" are drained away and uterine spasm sets in, and ere the woman becomes exhausted. (5.) In some cases of extreme depression, arising from loss of blood, exhausting discharges, or protracted ill-health, the patient may be spared the shock of introducing the hand, where it may be needful to turn.

Difficulties and Risks of the Method.—(1.) It is difficult of performance, if not impossible, when the liquor amnii has been evacuated, and the uterus is contracting strongly. Still, under chloroform, the breech may be depressed a little from without. (2.) Excess of liquor amnii impedes (though not so much as its absence), by rendering the fœtus too mobile, and preventing us from bearing on it so well. (3.) The actions of the abdominal muscles and the contortions of the female hinder, but not so much under chloroform. (4.) Thickness of uterine and abdominal walls is an obstacle. If the woman have a deal of adipose tissue anteriorly, no little difficulty will be experienced in discovering and bearing on the breech.

Risks.—These are not great. We might set up metritis by the external pressure, and we might convert a head presentation into a transverse one.

285. **Cephalic Version, or Version by the Head.**—This was the method employed in the earlier times of obstetric science, podalic version not being practised until the sixteenth century. Among the ancients, the doctrine was strongly held, and properly so, that the head was the natural presentation; and, accordingly, Hippocrates and others recommended that, when any other part presented, it should be made to recede, so that the head might be brought down. This method of turning fell into desuetude, but was revived by Flamant of Strasburg in 1795.

It is only warrantable—(1.) When the head is not far removed from the brim. This is pointed out by Van Swieten in his "Comment," vol. xiv. p. 14. (2.) When the pelvis is roomy. (3.) When the fœtus is mobile; that is to say, the liquor amnii should not have escaped long, nor the uterus have begun to clasp the fœtus firmly.

This mode, under favorable conditions, may be adopted in a shoulder presentation.

Method of Performing Cephalic Version.—To substitute the head for the shoulder, we must push up the latter, then grasp the head, and bring it down to the brim. With the external hand the uterus is to be steadied, and by means of it we may also elevate the pelvic extremity of the fœtus toward the middle line. Dr. Wright, of Cincinnati, who has written an excellent paper on this subject, says that we may succeed well by applying the fingers to the top of the shoulders, and the thumb to the axilla, or to such a part as will give us lateral force; and then, with the external hand, pressure is made so as to dislodge the breech, and cause it to ascend toward the middle line. The head is thus, without direct force being applied to it, brought to the brim. In all cases, we must ascertain beforehand the true position of the head.

286. **Turning by External Manipulation Alone.**—To Wigand (Wig-

and und Gumfrecht's Hamburg Mag., 1807) is due the credit of pointing out most fully the amount that may be achieved by external manipulation alone; that is, where the liquor amnii is present. However, it was chiefly cephalic version that he effected in this manner. The subject has been handled ably also by Martin of Jena, and by Dr. A. Mattei; and numerous German obstetricians of eminence, such as Scanzoni, Naegelé, Busch, Kilian, and Arneth, have written in approval of it. Dr. Mattei (Essai sur l'Accouchement Physiologique, p. 185) has given it the most strenuous support, and pointed out that it is suitable not only for transverse, but likewise for breech cases. He says that the breech may be carried up to the fundus, and the head brought to the brim by external manipulation. The able Corsican, in his zeal for an operation in which he himself has been pretty successful, has become blinded to some of its difficulties and risks. Of course, the operation is done in such cases before labor has set in, the mal-presentation being made out by auscultation, palpation, and the vaginal touch; but who can tell but that the fœtus may rectify its position, if not interfered with, as undoubtedly sometimes happens? Another objection to it is the risk of exciting uterine action prematurely. Thirdly, we object to altering a breech presentation, because it usually does well. Fourthly, we may fail in altering the presentation, and mayhap, by manipulating the uterus, set up metritis. Rarely, therefore, attempt to change a nates presentation. The recommendation to turn during the latter months of pregnancy, and before labor has been spontaneously initiated, is a somewhat doubtful proceeding.

287. **How to Turn by External Manipulation.**—The female is placed on her back, and then, with one hand, continuous pressure downward is made on that part of the fœtus lying nearest the os, while, with the other hand, the other part of the body is elevated. Then gentle, yet steady, force is begun in the interval of a pain, and continued till it has commenced; but during its acme the uterus is supported by both hands, and aided in completing the version. It is further recommended that, when the pain is going on, the patient should be placed on the side corresponding to that part which we wish to present. A cushion may be placed between the hand and the abdomen to avoid injury to the uterus, etc. After the cessation of the pain, the woman is again placed on her back. When we have got the part down which we desire should present, it is as well to rupture the bag of waters, and thus allow the uterus to grasp the fœtus better, and so prevent it from returning to its malposition.

288. **Dangers to the Mother from the Operation of Turning.**—These we shall detail, but at the same time may state that we have seen very little in the way of bad result in our own practice. If great care be taken, anæsthetizing the women well, and not forcing the hand recklessly into the uterus (or, in Hicks' method, not using too much external force), seeing also that the hands are clean, and the nails pared, and that the rectum and bladder are evacuated, we may lessen the attendant evils. If we also begin the operation at as early a period of the labor as possible, it will conduce to safety and success. The dangers are—To the mother: (1.) Risk of lacerating parts, or rupturing uterus. (2.) Inflammation from irritation, etc., of the operation. (3.) Puerperal fever, or phlebitis, from the same. (4.) Serious, if not fatal, nervous shock. To the child they are: (1.) Death from compression of the cord (that is, in podalic version), and consequent interruption of circulation. (2.)

Death from over-extension of the neck. (3.) Dislocation of spine or thighs. (4.) Laceration, or even separation of limbs (see a case reported by us in the *Lancet*, 1870). (5.) Compression of the head.

We have, happily, as regards the mother, seen few of those evils in our own practice.

After-Treatment.—If the case have been a pretty difficult one, the woman may have ℳ xxx. Liq. Morph. Hyd. She should be kept quiet, and if abdominal tenderness or pain were setting in, we would repeat the narcotic, substituting for the morphia a grain of Pu. Opii. A counter-irritant, such as turpentine over the abdomen, or hot poultices, or a few leeches, may be had recourse to.

CHAPTER XXV.

INSTRUMENTAL DELIVERY. INSTRUMENTS EMPLOYED IN LABOR.

289. (1.) **The Vectis, or Lever.**—This instrument, which was probably invented by Roonhuysen, and communicated by him to the elder Chamberlen, has been differently estimated by obstetricians. We may state that it consists of a single blade, curved and fenestrated. As a rule, experienced practical men do not favor it much. It has been used both as a lever and a tractor. As a tractor we have found it of no utility. Use even moderate tractile force and it invariably slips: thus it is no competitor with the forceps. *As a lever can we achieve much by it?* Not a great deal, and for this reason: that in order to work it successfully, we have to make a fulcrum of the maternal parts, and if so, it is clear that contusion, and probably sloughing, may be occasioned. Some mal-positions of the head may be rectified by it, but not easily. For instance, when the occiput is extended backward, you may, *with singular skill*, alter it to one of vertex presentation. We are of opinion that it is not proper to assist the rotation of the head by means of it, the hand and natural powers being preferable. It is truly amazing that some able authors (they are few, however) still cling to it as a tractor. That they do so almost impels us to the uncharitable conclusion that they have had, *qua* the vectis, little practical experience. Under this head it may be stated that in the Dublin Lying-in Institution, under the skilled and experienced mastership of Dr. Collins, the vectis was employed only three times in 16,000 cases. On the whole, then, we view this instrument as of trifling value.

(2.) **The Fillet or Lacque.**—This is one of the oldest of obstetric instruments, and may possibly have helped brethren who practised before the invention of the forceps. It has been variously manufactured, but generally has been made with a piece of ribbon, or linen, or leather, one inch in width, and twelve inches in length. This "was formed into a running noose, and sometimes sewn up like an eel-skin, open at both ends, to admit the introduction of a piece of whalebone or wire throughout its entire length, so as to facilitate its application."

One of the latest is that of Dr. Eardley Wilmot. This consists of a slip of whalebone fixed into a handle, composed of two separate halves joined into one. The loop is introduced wherever practicable, and employed as a tractor. Now, with reference to this instrument, we beg deliberately to say that we estimate it very lightly, more particularly as helping the descent of the head. We can scarcely conceive of an experienced practical man in these days ever dreaming of using it here. In breech cases there may be some justification for its employment, but in such instances we can do a good deal with the hand. Moreover, let it be understood that the forceps, although apt to slip, will often be of much and preferable service. If the forceps slip, by means of one's left hand especially, we can usually with facility seize a leg and help descent. We are in the catagory of those, then, who do not lament the lowering of its prestige, or its falling into disuse.

290. (3.) **The Blunt Hook**, like the fillet, is also an old instrument, and has not a few advocates of its utility as a tractor. It is employed in difficult breech cases, where a foot cannot be brought down, and where we fail, which is not often, to secure descent by means of the index and middle fingers hooked over the hip. The application of the instrument is not free either from difficulty or risk; nor is extraction devoid of danger, alike to the maternal and fœtal parts. The blunt hook is also employed with effect in helping the exit of the shoulder. But bear in mind again that the fingers must have the preference. One may employ the instrument variously after the operation of embryulcia, but even here, though there can be no risk to the child, the maternal parts must be carefully watched. Doubtless in the blunt hook we have a useful addition to manual extractive force.

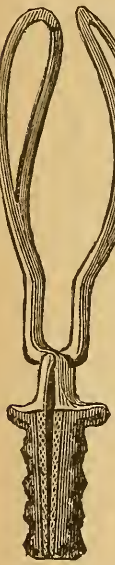

Fig. 26.

Method of employing it.—Warm and grease the instrument: introduce the hand to that part of the fœtus where we wish to apply the hook, and make it glide gently and cautiously along the palm of the hand.

(4.) **The Forceps.**—This is an instrument which we can scarcely praise too highly, or adequately estimate the benefits it has conferred. Before its invention, there was little to assist the uterine force in the way of traction, save by the feeble and uncertain fillet, or the hook, which as we have remarked, is fraught with maternal and fœtal danger. There can be little doubt that this instrument has conserved innumerable lives; and in these days of artificial or less natural existence, the want of it would have been a great calamity.

The great invention is due to Dr. Paul Chamberlin, the date being about 1647. Since that period countless instruments have been introduced, their various authors believing that they had achieved improvements on those of their neighbors; but, in many cases, judging from the production, the time might have been more profitably occupied. There are two kinds, the long and short; sometimes, as in the case of Sir James Simpson's (fig. 26), one pair is adapted both for high and low operations. This may be termed either the long-short or the short-long instrument. It is a useful pair of forceps, but somewhat heavy.

291. **Short Forceps.**—These are employed only when the head is well down in the cavity of the pelvis, or on the perinæum. Their average length is about 12 inches, 8 of which go to the blade. Some have a second curve added, the convexity to correspond with the sacral cavity, and the concavity to the symphysis pubis; but this is only of advantage

in long-forceps cases, where the blades traverse the axis of the brim as well as of the outlet. Their greatest width, when locked, is about 3 inches, and the distance between the extremities of the blade is about an inch. The opening, or fenestra, in each blade is about 3 inches long and 1 inch wide, and its object is to contribute to the lightness of the instrument, and take off some pressure from the fœtal head. It also adds less to the size of the child's head. The forceps invented by the late Dr. Ziegler are about the simplest as regards application. In this instrument the fenestrum of the lower blade is continued down to the handle.

The Long Forceps.—This instrument is an inch or two longer in the handle, of rather greater strength, and possesses more lever power. It is applicable to those cases where the head has not descended below the brim.

292. **Statistics of Delivery by Forceps.**—Among British practitioners the forceps were used about 1 in 249 cases, according to Dr. Churchill.

In Germany, 1 in 106 cases.

In France, 1 in 140 cases.

Mortality to mother: British, 1 mother died in 21⅓.

France and Germany, 1 in 34.

Mortality to infant: Great Britain 1 in 4¾; Continent, 1 in 5¾.

Different results are obtained when we take an individual practice, or a particular institution. For example, in the Edinburgh Maternity Hospital they were employed only in the ratio of 1 in 472; and there was only one maternal death in 134. In the London Maternity the proportion of forceps cases was about the same, and the deaths even fewer. It would be a very great mistake, indeed, to imagine that these statistics even approximate to a correct index of the practice and results of the present time, either in this country or the Continent. As we noticed when speaking of the powerless labor, an opinion has been developing gradually that the mortality, both maternal and fœtal, characterizing the past, has been to a large extent owing to the habit of looking on the forceps as a somewhat unsafe instrument, and, in consequence, trusting too long to the natural powers. This growth of wholesome opinion is widespread; and there is now a large school who advocate the earlier assistance of the natural powers, as a measure calculated to diminish greatly the mortality of mothers and children. We have no doubt that, if proper statistics could be had, they would show that the forceps are a very harmless thing in experienced hands. A more striking illustration of their safety could hardly be given than that furnished by Dr. G. Hamilton of Falkirk. He delivered about 700 children alive successively with the forceps. We may rest assured, then, that as the plan of an earlier interference in the second stage waxes, so will mortality wane.

293. **Functions, Aims and Advantages of the Forceps.**—The forceps has the power of seizing and compressing the fœtal head, and is a lever and extractor.

It is used to supply the want of uterine action, or to supplement it, and to avert from the mother the dangers of a protracted labor, and, in many cases, the necessity for the graver operation of embryotomy. Thus, also, we are enabled to give the infant a chance of being saved. No other instrument can rival it as regards these objects.

Drawbacks and Risks of the Forceps.—There is frequently a difficulty in applying them, and getting them to lock (that is, in the high operation), owing to the want of room, the position of the head, or, as we have seen in one or two instances, tight bands on the internal surface of the uterus, due to local spasm. We may lacerate the os, or even the body of the uterus. If the head be jammed, and a good deal of force be required, they may lose hold, and require re-introduction. The compression of the child's head may destroy it, or, if not, it may lay the seeds of cerebral disorder, leading to idiocy, paralysis, etc.

294. **Conditions Demanding the Use of the Forceps.**—It is very important to appreciate aright the circumstances necessitating the employment of the forceps. It is an instrument with which we may readily inflict injury, and we will be careful not to employ it unless we are fully warranted in doing so. Some authors, by way of warning to juniors, portray a black list of forceps evils—vesico-vaginal fistula, paralysis of bladder, constant dribbling of urine, recto-vaginal fistula, etc. Well, undoubtedly, such bad results may be produced by the forceps; but they are more frequently owing to the want of them. Nearly all these cases are imported from outlandish districts, where women have to rely on women unskilled—where male adepts are with difficulty to be had—and where, in consequence, the labor has gone on for days, to the serious contusion of the soft parts. With the forceps timeously and skilfully applied, we need rarely have a slough leading to a hole from the vagina to the bladder, or an aperture into the former from the rectum. The great thing is, then, not to employ the forceps when they are not required, and not to delay applying them when they are really needed. *When are they required?* When we find that the impediment cannot be overcome by the powers of nature, the uterine contractions, and the voluntary or respiratory efforts: where these natural powers are wanting or feeble, and cannot be roused by ergot, etc., and where, of course, we are of the opinion that the head can be brought down without tremendous force, calculated to bruise seriously the maternal parts, or crush injuriously the fœtal head. Sometimes we get the forceps locked in cases where the head has not cleared the pelvis, and find, after all, that it is impossible to drag it through. In such instances the head has to be lessened. There are other instances, too, where the forceps ought to be employed, viz., where the labor goes on slowly in the second stage; makes a little progress, but tardy, the head not getting jammed but the female becoming exhausted, as we have before noticed.

295. Other cases demanding the forceps (unless we elect version) are complications, such as hemorrhage, hernia, convulsions, and prolapse of the funis. We will not judge altogether by time when the forceps are to be used. The views of Denman, Merriman, and others, that "the forceps should not be applied until the ear of the child has been within reach of the operator's finger for at least six hours," are now in course of entire explosion. If we were to wait on and abide by this rule always, we would inflict much injury in many cases. What of exhaustion setting in, or hemorrhage, or convulsions? The recommendation that an ear should first be felt need not be adhered to: there are no better guides for the application of the instrument than the sutures and fontanelles of the cranium. We will just enumerate again the cases suitable for the forceps.

Cases suitable for Forceps.

1. An average-sized pelvis, with the head of the child above average size.
2. Moderately-contracted pelvis.
3. Uterine inertia, incapable of being roused by ergot, by stimulants, or galvanism, etc.
4. Complications, such as exhaustion, flooding, convulsions, prolapse of funis, hernia, rupture of the uterus, asphyxia, etc.
5. The advent, during labor, of any conditions calculated to endanger the mother or child.
6. When the natural powers do not expel the child within an hour or two after the full dilatation of the os.

In several of these cases we may with much success elect version in preference to the forceps.

296. **Method of applying the Forceps, Rules to be observed, etc.**—When we have decided to apply the forceps, we should mention it

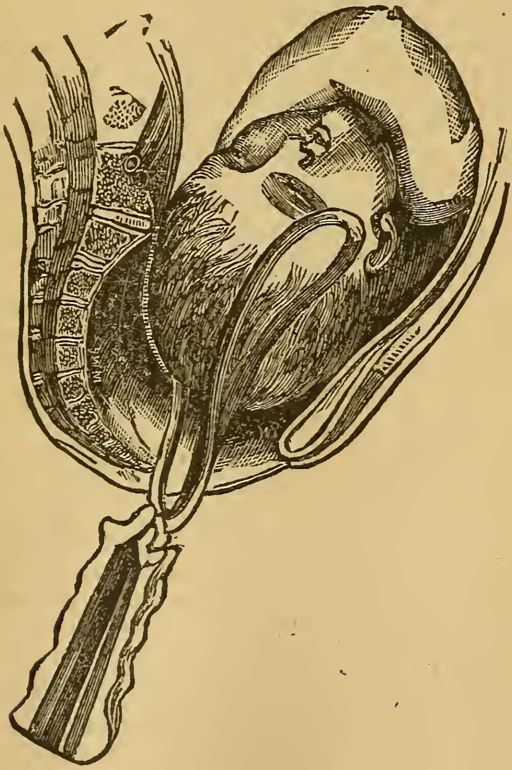

FIG. 27.

to the woman, and obtain her consent. The instrument should not be surreptitiously used. Few females will object when they are made aware in a kind, but firm and unhesitating manner, that it is essential to their own safety and that of the child. If they do so, we must be firm, and carry out our purpose. After placing the blades in a vase of warm water, you anæsthetize the woman, and lay her across the bed, the nates being close to the edge, and the body in the usual left lateral position. If your forceps have the upper blade shortened, you can manage without drawing her to the edge. Draw the knees up toward the abdomen, and make the nurse elevate the right leg. It is understood that the rectum and bladder are not distended, and, above all, that the os uteri is well dilated. Grease the blades of the instrument on removing them from the water, carry three or four fingers gently into the vagina, and guide the blade along their palmar surface until it enters the uterus. With these fingers you guide it so that it does not get behind the os, if that be not thoroughly one with the vagina, but into the uterus. Of course, where the head has escaped from the uterus, there is little fear of this. The instrument should not be passed during a pain; and we must keep in mind the pelvic axes, the curve—passing the instrument first in the direction of the outlet, then in that of the brim. As regards the blade to be applied first, it is usually the lower one, or that with the lock looking forward. When this blade has been well introduced, and

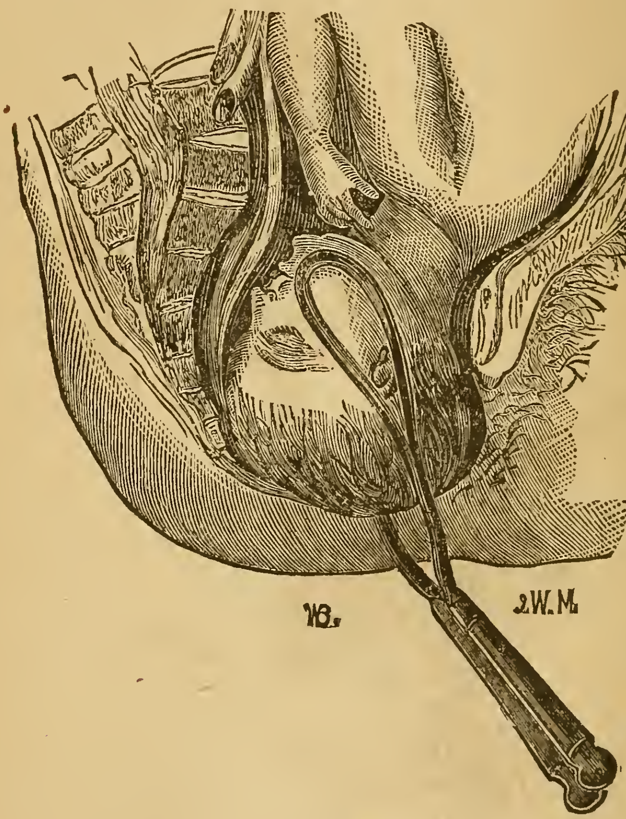

FIG. 28.

its shank resting against the perineum, the nurse should steady it until the upper blade is applied precisely opposite the first. When this is done, both are to be brought together and locked. Little or no force should be used in locking them—rather remove the blades, and re-adjust them.

297. As regards the direction in which the blades must be applied, this will depend on the position of the head. They must always be in the transverse diameter of the fœtal head—that is, in one or other of the oblique diameters of the pelvis. In using curved instruments, see that the convexity corresponds with the concavity of the sacrum. If care be not exercised, we may pinch the vagina, or tear the perineum. It is sometimes necessary to tie the handles of the forceps together, the better to prevent them from slipping. In reference to the direction of the tractile force, this will depend on the position of the head. When it lies high, as in a long forceps case, we pull first in the direction of the inlet, or downward and backward, then downward and forward. The pull

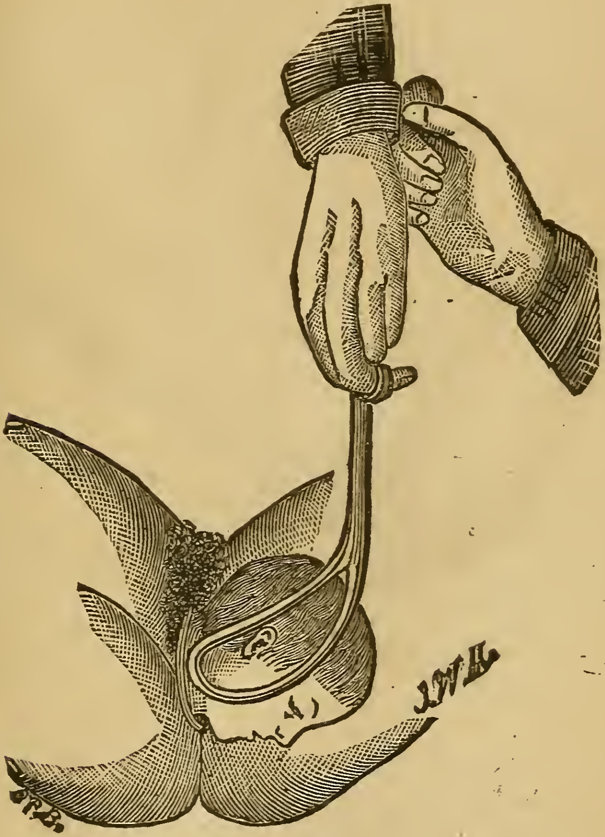

FIG. 29.

should not be a strong, steady one, but intermittent, and when it can be done, in aid of, and along with, the natural efforts. Move the combined handles in a circular direction, and not either purely vertically or laterally. If we meet with a case where much tractile force is necessary, we may relieve the compression of the head occasionally by separating the handles. We often derive useful information of the progress the head is making by introducing a finger or two of the left hand while pulling with the right. In this manner we are enabled to regulate better the amount of tractile force required. When the head is down on the perineum, we may remove the blades in many cases, and allow the natural efforts to complete the delivery, thus averting any chance of tearing the perineum with the blades at least. But in a case of inertia or exhaustion, or, indeed, any serious complication, this would be a culpable piece of delay. In removing the blades, do it cautiously, drawing the lower toward the left, and the upper towards the right thigh. Litzmann, Duncan, and others, we may state here, object to any pendulum or oscillatory movement of the forceps. Duncan's paper will be found in the Transactions of the Edinburgh Obstetrical Society, vol. iv.

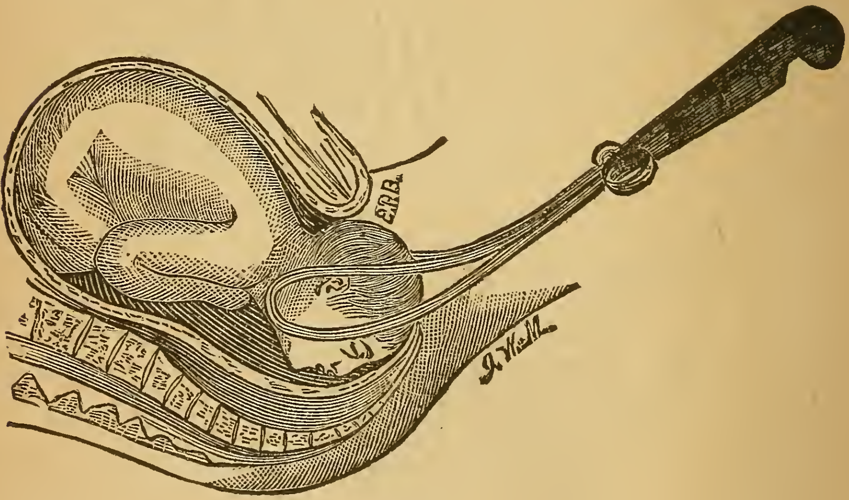

FIG. 30.

298. **The Long Forceps** (Fig. 27).—There is a difference of opinion in regard to the best position in which to apply this instrument. Its application is easiest in the oblique diameter of the pelvis; but in grasping the head in its longitudinal diameter, we increase to some extent the transverse, and thus we may have difficulty in delivering, seeing that it is the diameter of the pelvis which corresponds to this transverse of the fœtal head (viz., the antero-posterior), which is contracted, and, in fact, compels us to use the long instrument. If we wish to compress the head a good deal we will succeed best by applying the instrument antero-posteriorly. The late Sir James Simpson strongly urged the oblique diameter as the right and best position.

Short Forceps.—(Fig. 28.)—These may be applied in any of the diameters of the pelvis, but the oblique is the best. If we cannot apply them laterally, as happens in some cases, the upper blade may be introduced under the arch of the pubis, and then changed to the oblique position.

After-Management of Forceps Cases.—If the operation have demanded a good deal of force, an opiate may be given. Sometimes catheterism is required for a day or two. We look after the soft parts, and judge of their condition by the temperature and discharge. If slightly contused, a little simple ointment or warm-water injection will soothe. If inflammatory symptoms set in, they must be met as before indicated.

Sir James Simpson invented a tractor, consisting of a cup of vulcanized india-rubber, to which an air-exhausting syringe is attached. The cup is applied over the child's head, and the air being then exhausted, great force can be employed. The difficulty is in getting it applied close enough to the fœtal head. We fear it is not a very practicable instrument. (See Fig. 31.)

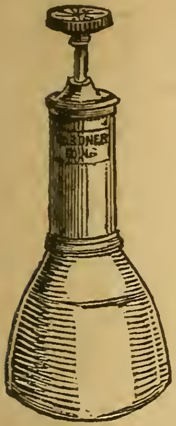
Fig. 31.

CHAPTER XXVI.

OBSTETRIC OPERATIONS.—CRANIOTOMY, EMBRYOTOMY, CEPHALOTOMY.

299. We have hitherto spoken of operative interference undertaken to preserve the safety or the lives of the parent and child, but now we arrive at an operation which involves the destruction of the latter. It is a serious proceeding, and one not lightly to be undertaken—not, in fact, to be thought of without the sanction and co-operation of the best professional skill that can be obtained. The operation was performed in the times of Hippocrates. The procedure consists in making an opening by the perforator into the head of the child, and then extracting by means of the crotchet, or by the blunt hook, or the cephalotribe.

There are many who view the operation as unjustifiable, nay, immoral, when the child is living, and they maintain that we ought to perform Cæsarian section instead. Those who oppose craniotomy argue plausibly that human life is not at the disposal of any but Almighty God, and that for the obstetrician to sacrifice it is to commit the sin of murder. The question is one on which our own mind is not entirely made up; although in saying this we are condemning ourselves, for we have unfortunately had to perform the operation frequently. There are other alternatives to this sad operation, such as the induction of premature labor and the Cæsarian section. The former we believe most firmly to be our duty to press upon the mother, whenever we have discovered that her pelvis will not permit of the delivery of a living child at the full time; and we never fail to impress her with the necessity of her being prematurely delivered in such cases. The other operation has usually, in this country at least, been almost universally fatal to the mother, and though we might save the child by its performance in some cases, we are almost sure to sacrifice the more precious life, that of the parent. Some who adopt the view, that we are not justified in killing the child, recommend waiting until it is dead; but, in addition to its being difficult to tell when life has fled in many cases, by this delay we are compromising the woman's safety. Denman remarked that, in adopting this operation, we were only following the plan of Nature, who in these cases commonly kills the child before the parent; that is to say, when labor is allowed to go on in instances of distortion, for days it may be, the infant succumbs first.

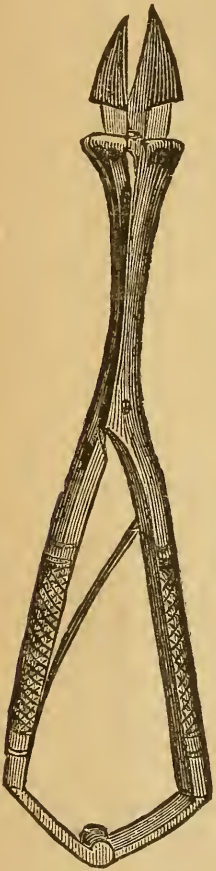
FIG. 32.

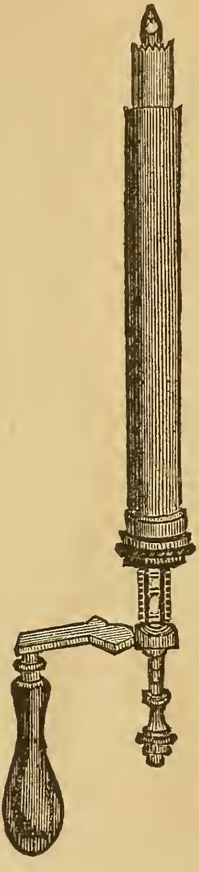
FIG. 33.

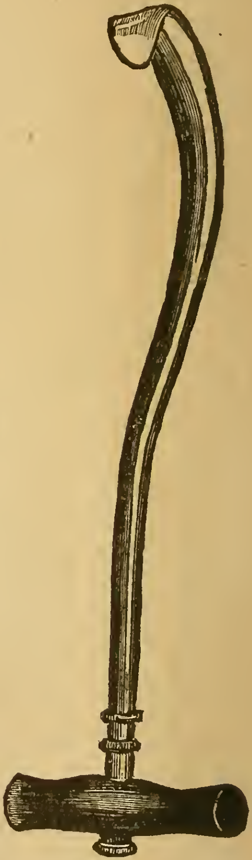
FIG. 34.

300. **Statistics.**—The operation is performed in Britain in the proportion of 1 in every 350 cases; in Germany, 1 in 1400; in France and Italy, 1 in 560.

Mortality to Mother.—In 371 cases there were 69 deaths, or 1 in $5\frac{3}{8}$. This is a much greater mortality than in the case of version or the forceps, and must be owing to the fact that in numerous instances the labor had been allowed to go on for a long time before perforation was resorted to. There are individual practices where the mortality has been considerably less. We have operated frequently, and all the mothers recovered. Dr. R. Lee had only four maternal deaths in eighty cases. Dr. Churchill performed the operation on twenty occasions without a single death.

Instruments.—The instruments required are just the perforator or scissors (Figs. 32 and 33), the crotchet or sharp hook (Fig. 34), craniotomy forceps (Figs. 35 and 36), and blunt hook (Fig. 37). There are various other instruments fitted to render useful help at times, such as the cranioclast of Simpson (Fig. 38), and the osteotomist (Davis), for crushing bone (Fig. 39).

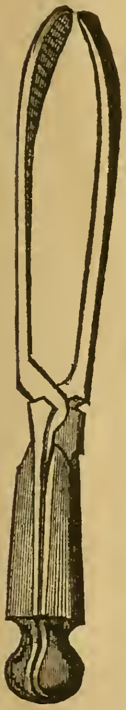

FIG. 35.

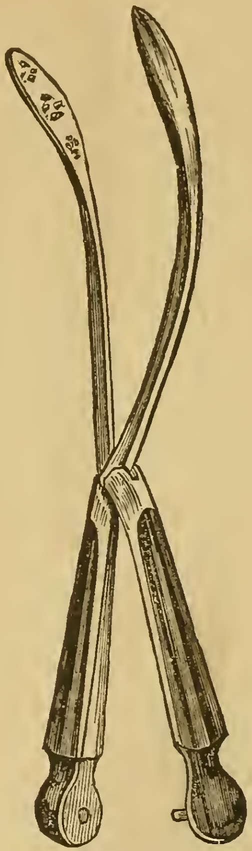

FIG. 36.

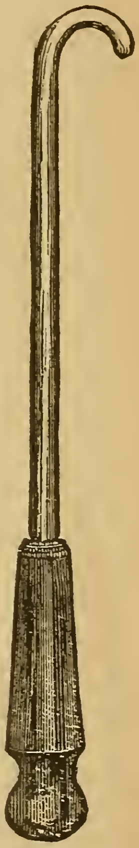

FIG. 37.

In some cases the head will come down after perforation without any help beyond the natural powers, or the fingers simply. But in such cases there could be no extreme distortion; and probably in some of these the dexterous use of the long forceps would have succeeded.

301. **When is Craniotomy Necessary?**—Speaking generally, we say that this operation is necessary when it is found that it is impossible for a living child to be expelled naturally, or by means of version or the

forceps; where the labor, if permitted to go on unaided, would terminate in the death of both mother and child.

The diameter rendering the operation inevitable has been variously fixed. Baudelocque thought the crotchet impracticable with a brim (antero-posterior) of one and two-third inches. Others, such as Dr. Davis, say that we may succeed even with an inch. Dr. Churchill says he would not have recourse to it unless he had a conjugate of fully two inches. We think the doctor is right, and for this reason: we are performing the operation for the preservation of the mother; but what are her chances with a conjugate of only an inch? What dangers does she not undergo during the forcible dragging of a mutilated child through such a contracted pelvis? What risks of contusion and laceration, and consequent inflammation—if, indeed, the shock, and perhaps loss of blood, does not carry her off soon after the delivery is accomplished. In not a few of those extreme cases death took place a few hours afterward. We should say, then, that two inches is little enough, and that under that, it would be better to undertake the Cæsarian operation, with its prospects of a

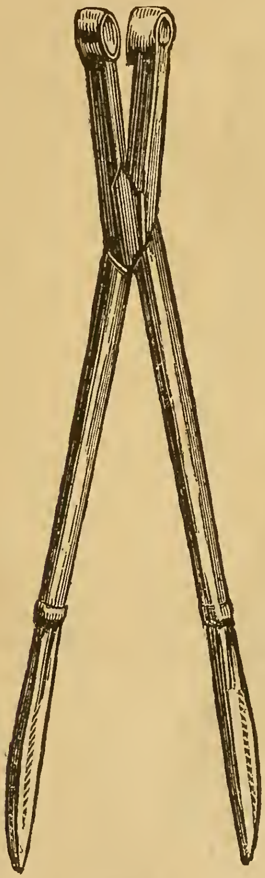

FIG. 38.

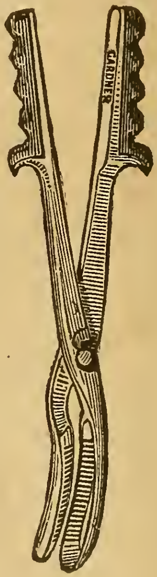

FIG. 39.

living child, and also (though, it must be confessed, a very small one) of a living mother.

302. **Particular Cases in which the Operation may have to be resorted to.**

1. If we were aware that the child was dead, or hydrocephalic, or the labor very tedious.
2. In cases of ruptured uterus, or convulsions, if we found it impracticable to deliver by the forceps or by version.

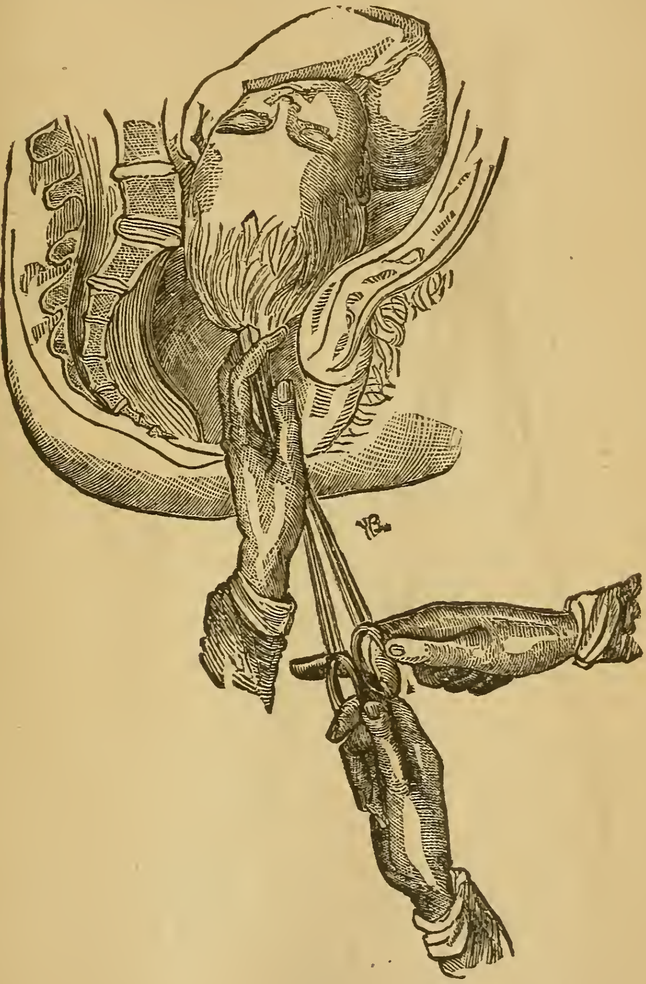

Fig. 40.

3. After turning, and yet failing by a warrantable amount of traction to get the head through the pelvis. Sometimes the head has been severed in these cases by the strong traction.
4. In cases where flooding is profuse, and threatening to destroy the woman, yet where, either from pelvic distortion, or an uncon-

querable rigidity of the os uteri, neither the forceps nor turning are practicable.

5. In malignant disease of the os and cervix, rendering the forceps and turning impossible.
6. In tumors of the uterus or pelvis, and in ovarian disease; also encroaching upon the pelvis, where the forceps or version are ineffectual, where tapping is unsuccessful, and where it is impossible to push the tumor above the brim.
7. Where an arm descends with the head, and where version is inapplicable from want of room.

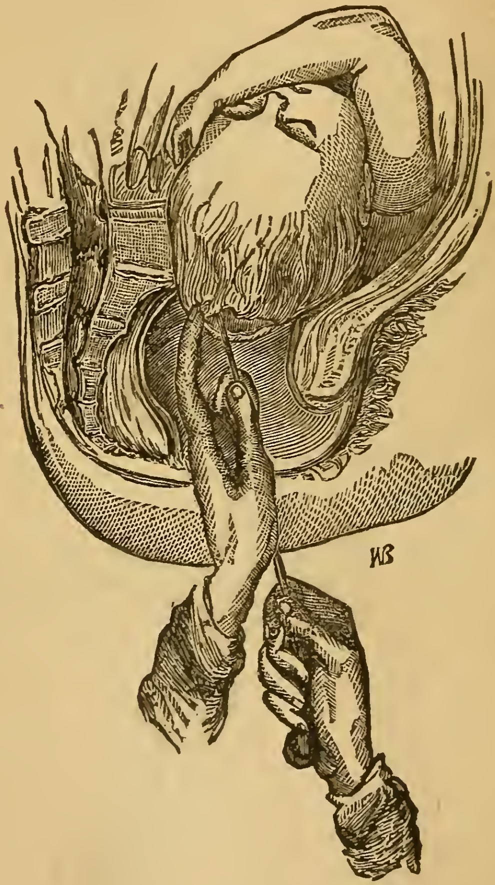

FIG. 41.

8. In cases of exhaustion, whether due to flooding or to the labor having been allowed, for want of proper skill, to go on for an unjustifiable period; and where, the forceps being impracticable, the woman cannot bear the shock of turning.
9. In footling, or in pelvic presentations, where the head has become severed from the trunk during traction. Cases of this kind are recorded.

303. **Method of Operating.**—The patient is to be placed in the same position as when the forceps are to be applied, but the hips should be rather over the edge of the bed. The rectum and bladder are to be evacuated if necessary. An assistant should place his hand over the uterus, bearing it down a little, and steadying it. In forceps cases it is necessary to have the os uteri dilated; but here, though more convenient, it is not indispensable. We have had to perforate with the os not much above the size of half-a-crown; and we frequently find that it is slow in dilating in distortion cases, owing to the head not getting down upon it. Introduce two or three fingers of the left hand into the vagina, and up to, and in contact with, the part we wish to penetrate. (See Figs. 40 and 41.) Then carry the perforator carefully along the palm, the fingers shielding it as far as possible, until the point touches the cranium. Press the perforator then firmly against the skull with a semi-rotary motion, when it will soon be found to enter. At the time we are pushing in the point, the assistant should steady the uterus and fœtus carefully. It is better to avoid going into a suture, as the bones close in again when this is done. We have never found the cranial bones offer much resistance. When the perforator has entered up to the studs, the handles are then to be opened, so as to extend the wound. Turn the instrument half round, without withdrawing it, and then separate the blades as before, so as to make a crucial opening. We must, while this is being done, take care not to injure the uterus, or the contiguous viscera, the rectum, or bladder, when the cutting edges are directed antero-posteriorly. When our aperture is thus made large enough, the instrument is to be urged cautiously on to the cranial base, and turned round and round, so as to break up and disorganize the brain. A few movements of the instrument especially toward the base, are necessary, because life may be maintained if the structures here are not well broken up. In some instances, after craniotomy has been performed, and part of the brain removed, the child has breathed notwithstanding, and even cried, after delivery, to the profound regret and horror of the accoucheur. A case is reported in the Med. Chirurg. Trans., Vol. xii, p. 308, where a child lived forty-six hours, cried frequently, and passed fæces and urine, despite the fact that the cerebrum was broken down and two oz. of brain evacuated. In this case it was found that the cerebellum and medulla oblongata were uninjured.

304.—**Extraction after Perforation and Cerebral Evacuation.**—Various plans may be adopted to effect delivery after perforation and the evacuation of brain matter. Sometimes immense collapse of the bones takes place, and the uterine pains suffice to expel the child, aided perhaps, or not, simply with one's fingers; but this is a result we need not look for in extreme contraction. The other means are the craniotomy forceps, the crotchet, the cephalotribe, the blunt hook, the osteotomist, and version. As regards the cephalotribe, we have devoted a chapter to it further on. The crotchet is a very effectual instrument; but care must be taken to get it well fixed, and that during traction it does not slip suddenly, and tear the maternal parts. We introduce it carefully, and fix it on the internal part of the skull, wherever we can find a sufficiently firm and resistant part. Opposite that part of the cranium where we fix it, and on the outside of the cranium, we place a finger or two; and thus, if the crotchet should, by the force exerted during traction, cut through the bone, our fingers shield it, and avert injury to maternal parts. Better the accoucheur to suffer a little than the poor woman's parts be lacerated. Let the tractile force be slow, cautious, yet steady, and downward and backward in the direction of the axis of the pelvic brim, in the first instance. If the crotchet should penetrate the bone, or lose its hold, we must seek another and firmer part, and pull in the same steady way, without any jerking motion. There is a caution to be kept in mind, viz., to shield the cranial bones with the scalp during extraction, for we may seriously lacerate the parts if any spiculæ are allowed to protrude. Injury has been done by neglecting this precaution.

305. If the head cannot be brought down in this way, it will be necessary to break up the cranial bones, and pick them away with the craniotomy forceps. Some use these forceps also as a tractile power. The late Dr. Zeigler invented an excellent pair for extractive purposes, the blades being grooved on the inner surface. (See Fig. 35.) They were employed in the same way as the forceps, both blades being placed on the outside of the cranium, instead of, as in the other case, one blade inside and the other externally, and they kept a good hold in some cases, and answered well. If the ingenious doctor had carried his invention further, the laurels appertaining to the invention of the cephalotribe might have been his. The ordinary craniotomy forceps (Fig. 42) we have not found to hold so well as the crotchet. If you exert only mod-

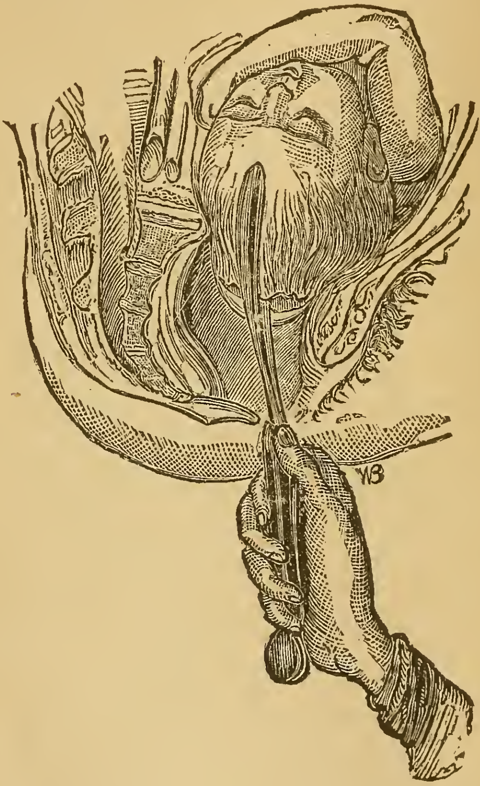

FIG. 42.

erate extractive force, you simply bring away a bit of bone, without making the rest of the cranium advance. The blunt hook is useful where we want to employ strong tractile force. It may be fixed in the foramen magnum, or in one of the orbits. By it we may obtain a hold when the upper part of the cranium has been picked away. It is useful also for steadying the head in those unfortunate cases where it has been left behind the trunk, in addition to the pressure exerted by an assistant over the abdomen. The osteotomist is adapted for breaking up the bones at the base of the cranium in difficult cases. And here let us observe that it is the base that gives us the greatest trouble in extreme distortion, and renders the work slow, tedious, and difficult. In order to secure more perfectly the reduction of the base, it has been proposed to trephine it. For this purpose the "forcipe perforatore dii Fratelli Lollini" of Bologna was invented. It consists of strong pliers, to which is attached a movable borer. The vault and the base of the skull are pierced by it in different places. We have no hesitation in condemning this instrument, as likely, even in skilful hands, to injure the maternal parts. Guyon has a piercer or borer also, which he uses intra-cranially; but, like the previous one, it is neither so safe nor effectual as the cephalotribe.

That embryotomy has often been a tedious and difficult task in the past, is well known and amply attested. Smellie got worn out and stiff of limb at it, and had to rest and resume the labor. Dr. Hamilton has spent many hours at it, resting a bit and beginning again, until he got so exhausted that he had to be carried home in his sedan chair. Denman has labored at it with energy for hours, conquering its difficulties only when he himself was physically overcome. And that experienced veteran, Dr. Robert Lee, has perspired at it like a mariner in a storm. But although craniotomy in the past has thus been a work of great difficulty and labor, the modern operation need not be so operose. One reason is that we have now got suitable cephalotribes for crushing the base; and the other, that a very effectual plan has been pointed out by Dr. Hicks, whereby the broken cranium may be more easily extracted.

306. **Delivery of the Fœtal Head, Face Foremost, after the Removal of the Calvaria.**—Professor Burns, from experiments which he made, pointed out long ago that the base of the skull, after the removal of the calvaria, could be drawn down more readily with the face foremost than by any other method. Dr. Osborn thought he could abolish the Cæsarian section by tilting the base sideways, and drawing it thus down. Dr. Braxton Hicks agrees with the experienced Burns, and suggests that in bringing down the face the chin should be made to point out anteriorly. He has tested his plan in practice, and found it to answer well. His deductions are as follows: If the evacuation of the brain and the collapse of the calvaria be carried to a great degree, the facial presentation is the easiest method of delivery, provided that the mento-bregmatic diameter falls beneath the bi-zygomatic. And if the whole calvaria be removed, and the base only left, and then we induce face presentation, taking care that the chin as it descends points anteriorly, we diminish to the very smallest amount, short of breaking it up, the opposition of the head, leaving, in fact, only from one to one and a half inches to oppose the antero-posterior of the brim. Dr. Hicks recommends that, where simple perforation fails to lead to the descent of the head, say, with three inches of conjugate diameter, then we are to break up carefully the bones of the calvaria, and remove a portion of

them; then (after enveloping the rest in the scalp) to induce face presentation. (2.) When the conjugate diameter is under three inches, we are to remove the entire calvaria, and then induce face presentation, seeing that the chin is kept forward. A small blunt hook fixed in the orbit will enable us to carry out this plan. We have no doubt whatever of the great utility, as well as the practicable nature, of this method of Dr. Hicks (and Burns), and believe it will contribute to prevent craniotomy from being the tedious business that it was in days gone by, when the unlucky accoucheur was equally exhausted with his unfortunate patient. For our own part, however, we have a leaning toward cephalotripsy, but shall not presume yet to say that it is preferable to the plan of delivering by the face. Dr. Barnes, in the second edition of his masterly work, Obstet. Operations, p. 300, endorses the method of Burns and Hicks, and deems it unjustifiable to neglect the operation, or prefer Cæsarian section to it.

CHAPTER XXVII.

OBSTETRIC OPERATIONS.—CEPHALOTRIPSY.

307. **The Cephalotribe, Embryotomy Forceps, or Head-Crusher and Tractor.**—This instrument consists of two strong blades, which can be brought together by a screw, so as to crush powerfully. (See Figs. 43, 44, 45, and 46.) A. Baudelocque, jun., has the credit of the invention, although it is alleged that Assalini originated an instrument of this kind, and which is described in a work published in Milan in the early part of this century. Baudelocque's instrument (see Fig. 46) was unnecessarily bulky and heavy; and this, doubtless, led to its being viewed with distrust, and the operation with disfavor at first, and for a considerable time. Now, however, we have a number of lighter ones, and yet potent enough for the purpose; they multiply, as do the forceps. Among those which we deem suitable for the purpose (and we speak from having both used and seen employed one or other of them) are the instruments of Scanzoni, Dr. Kidd, of Dublin, Braun, of Vienna, Dr. Braxton Hicks, and the late Sir James Simpson. Dr. Hicks' is a very suitable instrument. It has a slight pelvic curve, which renders its introduction easier, and its power of rotation is not much lessened. We think it will be interesting to give a table from Dr. Kidd's admirable paper, showing the weight and measurements of these, and also Baudelocque's, by way of contrast. We give cuts of Scanzoni's, Baudelocque's, the Edinburgh light, and the heavy French instrument.

308. The only point in connection with Baudelocque's instrument which we think might be copied is its length. Sir James Simpson's we have seen fail to grasp the base properly, but Dr. Kidd and Dr. Hicks have made their instruments rather longer. All the instruments have the inner surface of the blades grooved or indented, in order to secure a better grasp. Dr. Kidd's instrument has no pelvic curve. He thinks that, in antero-posterior contraction, where it is desirable to turn the shortened diameter of the head into the short diameter of the pelvis, the space through which the head will have to rotate, when turned with a

Measurements of Cephalotribes.

	Weight.		Entire Length.	Blades.					Handle.		Power.
				Length.	Breadth.	Thickness.	Closed. Breadth.	Pelvic Curve.	Length of Handles.	Length of Joint.	
	lbs.	oz.	In.	In.	In.	In.	In.	In.	In.	In.	
Baudelocque....	4	12	20.5	10.5	1.25	0.25	1.75	3.75	9	....	Winch and screw.
Hodge..........	3	12	19.5	Shank. $\underbrace{6.41+3.41}_{9.83}$	1.41	....	1.5 Curve for Head.	3	9.5	....	Screw and fly-nut.
Scanzoni........	....		18.66	10.15	0.98	0.27	2.04	3.81	8.54	....	Screw and lever, with travelling bar.
Braun..........	2	0	16	8	0.91	0.16	2.16	2	6.5	1.5	Screw and joint in handle.
Simpson........	2	4	14	8.5	1.12	0.25	2	2.37	4.5	1	Screw and fly-nut.
Hicks..........	2	6	15	9.25	1.12	0.25	1.5	3	4.5	1.25	Screw and two movable nuts.
Kidd...........	2	4	14	9	1.12	0.25	1.5	0	4	1	Screw and fly-nut.

straight instrument will be considerably less than when turned with a curved one. He makes the lock of the upper blade, instead of the lower, look forward, which he thinks facilitates introduction. In this we agree with him; but we are of opinion that the blades should possess a moderate curve.

Advantages of Cephalotripsy over the Crotchet.—Several years ago we read a paper before the Obstetrical Society of Edinburgh, contrasting the cephalotribe and the crotchet, and we alluded to the former in the following terms, to which we still adhere:

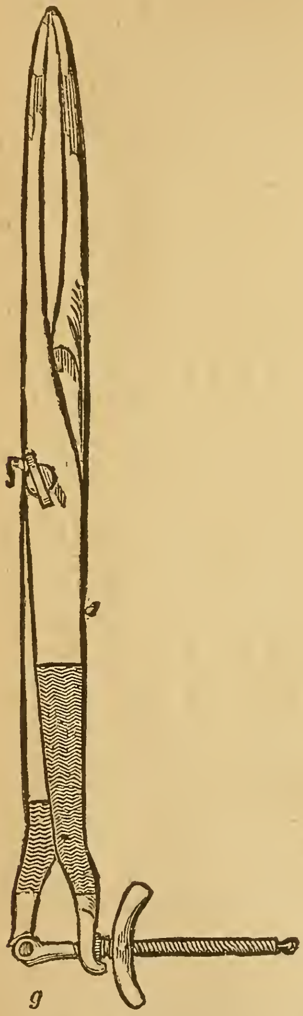

Fig. 43.—The long-handled, heavy French Cephalotribe, a modification of Baudelocque's. Available length of handle, *f* to *g*, is 10½ inches.

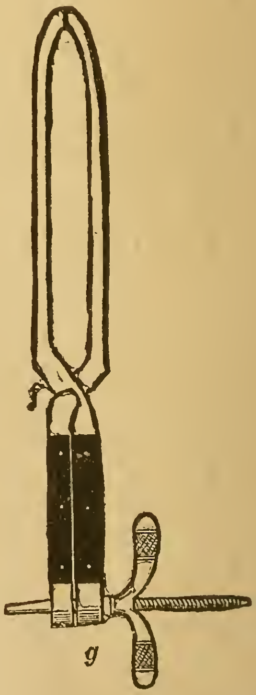

Fig. 44.—Short-handled and light Edinburgh Cephalotribe. Length of handle, *f* to *g*, 5 inches.

The principle of it is excellent; it has a twofold function; it both crushes and extracts; it is, so to speak, forceps and blunt hook and crotchet in one. While you are crushing you are also seizing a bull-dog hold for the purpose of extraction—a hold of tenfold security as compared with the craniotomy forceps, or any kind of hook under the sun. The advantage here is, that you may require only one introduction and one withdrawal, and thus happily and mercifully escape the weary and painful seizing and losing hold, pulling and picking, and ceaseless twisting and tearing, until the exhaustion of the operator is nearly equal to that of the hapless and suffering patient. With it your work may be over, and done well too, in the course of a very few minutes—ten, fifteen, twenty. Moreover, its crushing power is great, and herein lies one of its most favorable features; for it breaks down swiftly the cranial bones, including also the base, which latter is reduced with difficulty by the other instruments, even after the expenditure of much time, and skill, and pains. Indeed, if you survey the crushed heads in the obstetric museums, you will find that, as a rule, the base has escaped all the assaults of the craniotomist, who, mayhap, has bestowed hours on the work of reduction.

But a further advantage is that, by means of this instrument, you reduce the bones without much, if any, tearing of their coverings. The spicula, if there are any, do not protrude, but are encased in the safe envelope of an almost unbroken scalp. Soft parts thus escape the chance of injury, always dreaded under the other system, from sharp edges of bone during the descent of the mangled head. Swiftness, then, characterizes the cephalotribe, in contradistinction to the interminable delay of the crotchet—a delay the evils of which are too well known to require repetition—and greater security and safety, directly and indirectly, so far as the mother is concerned.

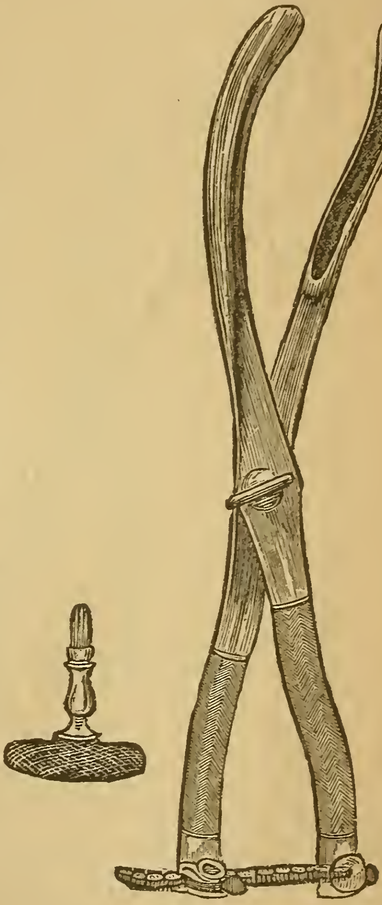

FIG. 45.—Scanzoni's Cephalotribe.

309. **Cases suitable for the Operation.**—These are all cases of distortion, where we have been necessitated to perforate, and also instances such as the following: (1.) Without perforation, when the inferior extremities and trunk have been expelled, and the forceps cannot be applied to the head, which is above the brim—the child being dead. The pelvis should not be smaller than the extreme craniotomy size, that is, from one and a half to two inches. We can both seize it firmly with this instrument, reduce it a little in volume, and deliver without much delay.

(2.) We may employ it to extract the head if it has been severed from the trunk and remains in the pelvis. (3.) To extract the breech of a dead child when it is obstructed in the pelvis. (4.) To compress and deliver the shoulder after the delivery of the head, when other plans have failed, and where it is absolutely necessary to diminish the bulk of the thorax. Our only other alternative here would be sharp instruments, with which we might wound the uterus. (5.) In presentation of the trunk, when the thorax is so placed in the pelvis that the hand cannot be introduced into the uterus to perform turning. The chest may be thus crushed, and a way of entrance made.

Method of Performing the Operation.—The bladder and rectum must be cleared out, and the os as fully dilated as possible. The head is to be well fixed, and steadied at the brim. Perforation is the necessary preamble of the operation, as with the crotchet. It does not abolish the perforator. It is necessary to say this, because some have based an objection to it on this ground (taking it for granted that the cranium was not previously opened), that though we diminish the diameter of the fœtal head by this crushing-instrument in one direction, we increase it in another, and therefore, in high distortion cases, are no nearer the mark. The objection would have force if we did not previously perforate, for Hersent has demonstrated, by numerous experiments, that as we lessen one diameter we augment another; but as the opening of the cranium is the indispensable initiative, it falls to the ground completely.

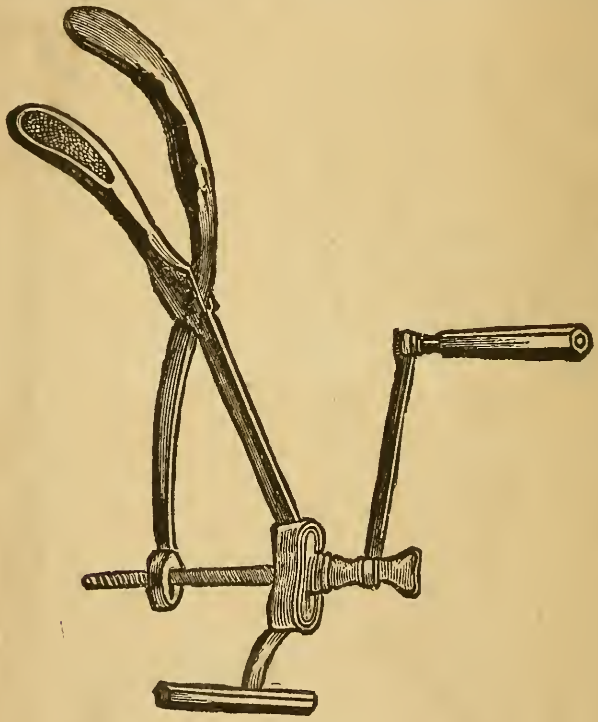

FIG. 46.

310. After perforating, we introduce the blades in the same way as the forceps, taking care that we advance them high enough to seize the base. To this end the instrument must be kept well up in the direction of the axis of the pelvic brim, the handles being directed back toward the perinæum. When the blades are locked, we screw the handles together, and thus crush the head of the child. Traction should then be made, and if the head does not come down, it should be rotated so as to bring its smallest diameter in relation with that of the brim. In some cases of extreme distortion it may be necessary to withdraw the instrument, and re-apply it in another direction, thus crushing the head repeatedly. Professor Pajot operates in this way, with repeated crushings, and without tractile force. His plan is this (see Archives Générales de Med., March, 1863): He introduces the instrument after perforation, crushes the head,

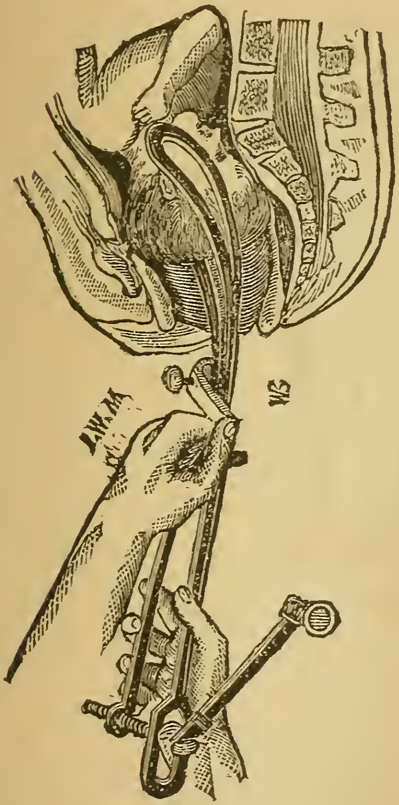

FIG. 47.

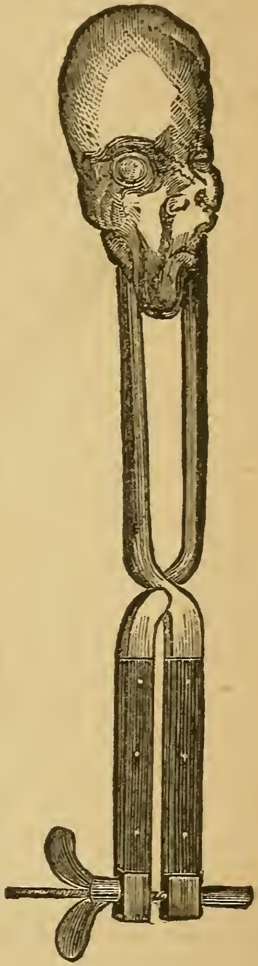

FIG. 48.

then withdraws, and crushes again two or three times at a sitting. If necessary, he repeats these crushings every third or fourth hour. The uterine contractions then suffice to expel the head. In some of these extreme cases the shoulders and thorax give as much trouble; if so, they are also to be crushed. Pajot says his method is suitable when the pelvis is not more than 27 millimètrés, or 1.06 English inches. He reports seven cases of extreme contraction, where, after crushing, all came away spontaneously, save one which required slight traction. One of them proved fatal.

We cannot say that we approve altogether of Pajot's method. It would never do in a case where the labor had gone on for a considerable time, and the woman had become exhausted. In delaying it for hours, crushing and stopping, and beginning again, we would simply be sacrificing the woman's life. In a case where labor had not gone on long, such as where we detected the distortion only, or were previously aware of it, we might crush two or three times, if need be.

311. If we withdraw the instrument, and trust to the natural powers to do the rest, we may have to re-introduce it under increased difficulties, for the passages—the pelvic linings—will have a tendency to become increasingly tumefied. The cephalotribe then is, as a rule, to be employed both as a crusher and a tractor, and it is this double function which in many instances renders it so valuable. One of our great objections to the crotchet and craniotomy forceps was the long period required to deliver by them in extreme cases, such as from three to five hours; but with this instrument, when we use it as a tractor, the delivery is accomplished in fifteen or twenty minutes. We have done so ourselves.

We may state here that Dr. Matthews Duncan has written a paper, in which he contrasts the Edinburgh instrument and the French one, or, as we might say, the short-handled and light with the long-handled and heavy cephalotribe, and he indicates a preference for the stronger instrument. Dr. Duncan holds that the cephalotribe is not a substitute for the crotchet; its primary intention is to crush. The lighter instruments, he holds, are not powerful enough to crush the base. They are too light, too flexible, and not long enough in the handles to give the requisite compressing power. Dr. Duncan has not ventured on mere assertion without grounds. He instituted experiments on fœtuses, and on dogs and other animals. These of course demonstrated the greater power of the French tool; but it appears to us that they did not show the utter inefficiency of the short-handled Edinburgh (or London and Edinburgh) instrument.

312. Dr. Matthews Duncan is eminently entitled to praise as a ruthless demolisher of all flimsy work—a pains-taking and acute sifter of evidence, and discoverer of facts; but we cannot agree with him in viewing the lighter tool as little more than mere forceps or crotchet, with tractile but not crushing power. Our reason is a very good one, viz., that we have crushed the base with it, and have seen others do the same. A good many other accoucheurs have also succeeded with it. At the same time it must be borne in mind that heads differ as regards hardness. Some are pretty soft, others preternaturally indurated, as has been seen in those cases where the point of the crotchet would hardly catch, if at all. In these cases the bigger instrument would do more potential crushing work, and therefore prove more useful. As we enlarge these instruments, however, we increase the difficulties of introduction. Dr. Dun-

can's instrument is a powerful one, and, we are persuaded, would not fail to crush in the most thorough manner the hardest head. In Germany there are various instruments employed, the preference being given to one more powerful than the Edinburgh tool, and less so than the French. In South Germany Scanzoni's is a good deal employed. In the North, Busch's, a pretty powerful instrument—stronger than the Edinburgh one—is used by many. Professor Braun's is a light one. In America Dr. Hodge's, a somewhat powerful one, is generally used.

313. **Limits of Application of the Cephalotribe.**—There will be great difficulty, even with the utmost dexterity, in applying this instrument with a conjugate of 1½ inches only. Pajot thinks that it may be used where there is only 1.25″ of antero-posterior diameter. Credé assigns no limits, but says it may be employed wherever we can get it to enter. Dr. Braxton Hicks has used it where there was only 1¾ in.; and Dr. Barnes has employed it successfully in a conjugate not exceeding 1.50″ (see Obstet. operations, 2d. ed., p. 302). He has come to the opinion that the operation is quite practicable with a pelvis measuring an inch and a-half of antero-posterior space. In an extreme case like this, we would require a very strong instrument, and the difficulty of the operation would be greater in consequence.

The Barnes Method of Embryotomy.—Dr. R. Barnes has originated a new method of embryotomy, adapted to the most extreme cases of distorted pelvis, at least in the learned doctor's estimation. It is by means of a wire-écraseur. He first perforates the head, then twists off a portion of the parietal bones by the craniotomy forceps, so as to destroy the sphericity of the head. (We quote from the 2d edition of the Doctor's work.) By this means a smaller wire-loop is required, it keeps a better hold, and cuts through the base more readily. The crotchet is next passed into the hole made by the perforator, and held by an assistant, so as to steady the head. A loop of strong steel wire is then formed, large enough to encircle the head. The elasticity of the wire permits of the loop being compressed by the fingers, so as to make it narrow enough to slip through the cervix uteri and the chink of the pelvic brim. The loop is thus guided over the crotchet to the right side of the uterus, where the face lies. The compression being removed, the loop springs open, to form its original ring, which is guided over the anterior part of the head. The screw is then tightened. Instantly the wire is buried in the scalp; and here is manifested a singular advantage of this operation.

314. The whole force of the necessary maneuvers is expended on the fœtus. In the ordinary modes of performing embryotomy, as by the crotchet especially, and in a lesser degree by the craniotomy forceps and cephalotribe, the mother's soft parts are subjected to pressure and contusion. The child's head, imperfectly reduced in bulk, is forcibly dragged down upon the narrow pelvis, the intervening soft parts being liable to be bruised, crushed, and even perforated. And this danger, obviously rising in proportion to the extent of the pelvic contraction, together with the bulk of the instruments used, deprive the mother, in all cases, of extreme contraction of the benefit of embryotomy, leaving her only the terrible prospect of the Cæsarian. When the anterior or posterior segment of the head is seized in the wire loop, a steady working of the screw cuts through the head in a few minutes. The loose segment is then removed by the craniotomy forceps. In extreme cases Dr. Barnes removes another section of the head by re-applying the loop over the occipital end of it. The small portion of the head remaining after the re-

moval of the second section offers no obstacle, but, on the contrary, affords a useful hold for tractile purposes. This remnant portion is seized by the craniotomy forceps, and the assistant holds this instrument firmly, while the operator proceeds to deliver the trunk. The assistant makes steady traction by the craniotomy forceps, and to one side, so as to get a shoulder into the brim. The operator then hooks the crotchet into the axilla, draws it down, and with strong scissors amputates the arm from the shoulder. This proceeding is then repeated on the other arm. Room is thus gained to deal with the thorax. This is perforated; the ribs are cut through in two directions; and the thorax and abdomen are eviscerated.

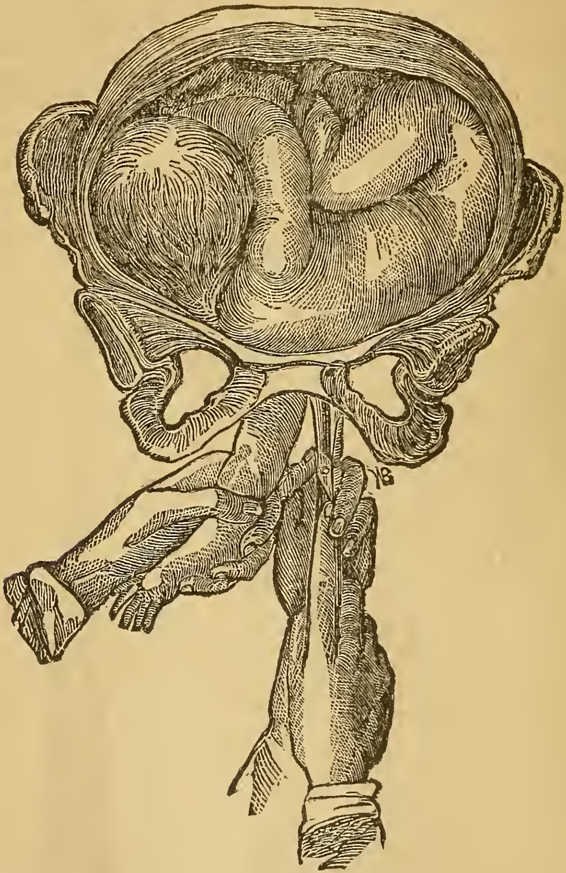

FIG. 49.

315. This operation of Dr. Barnes', then, consists of a reduction of the head by a process pretty harmless as regards the mother, and in a way calculated to diminish its bulk (that is, after more than one application), to at extent fitted to render descent by means of traction more easy and less perilous. It possesses the merit of ingenuity, with the demerits of being a little operose and difficult. It consumes a good deal of time—

not a light element in high distortion cases usually—and may be impracticable in contracted outlet (with ischial tuberosities preternaturally approximating, as in the osteomalacian pelvis). The doctor himself has not omitted to notice its drawbacks, and this is a feature in an author which we admire. It is a twin-beauty with another rare feature, vastly desiderated, viz., the publication by the leading men of their operative failures. A long succession of twins of this description would be of unspeakable service to us. But to return, we believe that Dr. Barnes, by this method, has increased those resources which enable us to avoid resorting to that very simple but also very fatal operation, the Cæsarian section.

316. (8.) **Embryulcia—Evisceration.**—This is an operation rendered necessary in some cases of transverse presentation, where turning cannot be accomplished, owing to the intensely spasmodic contraction of the uterus on the child, the latter being grasped as in a vise; also in "cross-births," where there is no room to turn, owing to distorted pelvis. We have no doubt that chloroform has diminished the cases of evisceration considerably. We saw a case sometime ago with Dr. Groves, of Trinity, where the uterus was in a state of tetanus, and had been so for

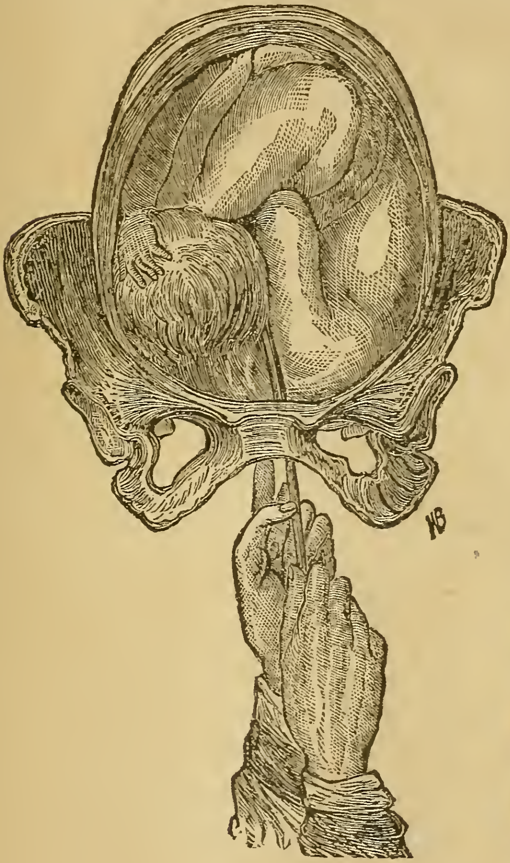

FIG. 50.

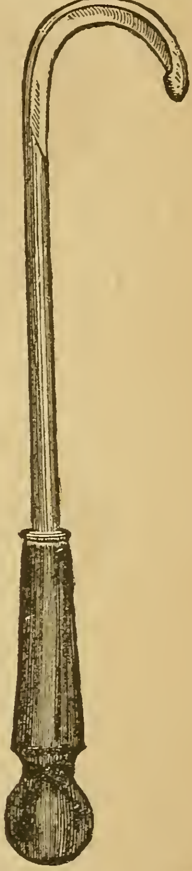

FIG. 51.

hours, and the fœtus was firmly wedged in the pelvis; a shoulder presenting. We thought after a trial of version, that we would have to eviscerate; but on placing the woman thoroughly under the influence of chloroform, we gradually reached a foot and turned. We saw another with Dr. Cochrane, of this city, a short time ago, where, despite the strong contraction of the uterus and dryness of parts, we were also enabled to turn, with safety to the mother.

The operation is thus performed: Introduce a finger or two into the vagina, and up to the ribs. Carry the perforator along their palmar surface, until it reaches an intercostal space, which is then to be penetrated, the arm being pulled down at the same time, so as to bring the chest into the pelvis, and make it more firm. (See Fig. 49.) A free opening should be made; and to this end we may cut through several of the ribs. If we make it large enough to admit the hand, it will quicken matters. When the thorax is pretty well cleared out, we may pierce the diaphragm, and thus afford a door of escape for liver, spleen, gut, etc. If after this the uterus does not manage to expel the fœtus (doubled, the breech coming down the sacrum and perinæum), we will have to employ the crotchet, which may be fixed within the ilium.

317. (9.) **Decapitation.**—This is an operation sometimes resorted to in tranverse presentations, where version is utterly impracticable owing to a small pelvis, or where the uterus is in a state of tetanic spasm, and closing tightly round the fœtus. Some wait until the child is dead, or supposed to be so. As we said, in speaking of evisceration, chloroform (with a little antimony, perhaps) gives us great relaxation; and we ought certainly to give version a cautious trial before severing the head, unless the child were dead. The usual decapitator is a hook with a sharp internal edge. Dr. Ramsbotham's sharp hook has been commonly employed, but it is somewhat difficult to get it over the neck in those tight cases. Something more flexible would suit better, such as a piece of whalebone, curved, and with an eye at the one extremity carrying wire or a piece of strong whip-cord.

How to Perform the Operation.—Pull down the neck of the child with a blunt hook, then pass the sharp hook (Fig. 51) up and over the neck, and commence a sawing movement. At the same time, with a finger or two of the left hand, be ready to guard the point of the instrument. With a little traction and sawing motion, the head will soon be severed. When this is done, deliver the trunk by making traction on the presenting and prolapsed arm. The head may be afterward delivered by the crotchet, or by the blunt hook, fixed in the mouth or foramen magnum; or better still in our opinion, by means of the cephalotribe, an assistant bearing down and steadying the head. Dr. Barnes' method might be tried. The sharp hook should not be straight, but somewhat curved, in order the better to get it applied. This would be an improvement on Ramsbotham's.

CHAPTER XXVIII.

OBSTETRIC OPERATIONS.—SPONDYLOTOMY.

318. In cases of arm or thorax presentations, with a small pelvis and a tetanic uterus—a uterus that will not relax under antimony and chloroform, and where, in consequence, we cannot reach a foot, so as to be able to effect version—this operation will be found almost infinitely preferable to decapitation or evisceration. We certainly advise a careful attempt at turning in such cases (waters long drained away, parts getting hot and dry, and womb the seat of tonic spasm), after endeavoring to relax the uterus; but a forcible entrance of that organ might land us into the abdominal cavity. Besides it happens sometimes that the resistance is so great that the strongest hand is unable to force (a reckless) ingress. Well, when the shoulder, say, is jammed against the pubis, and the head above the brim, there will be great difficulty in getting the Ramsbotham hook applied for the purpose of decapitation. When the body of the fœtus is forced down, and fills up the pelvis, you can hardly push up the hook without tearing the soft parts of the pelvis. Even when you do succeed in fixing the hook and severing the head from the body, there is the trouble in getting the head home, often very great. However, the cephalotribe has proved a great boon here; it is an efficient helpmate in decapitation. If the uterus is steadied and pressed down, you seize a more certain hold than with the crotchet, and faciliate descent and delivery by its crushing power. While you are crushing, you are also securing your tenacious grasp of the head—a hold that can very rarely, if at all, slip.

Then, in evisceration, how prolonged is the process in many cases? Hours have been consumed in its performance; the soft parts have been injured; and then there is the version afterward.

319. In spondylotomy delivery is wonderfully easy; for, after cutting through the spine, first one part and then the remainder is brought down with great facility. You have no trouble with the head, having an arm to make traction with; and the whole affair may be completed, after severing the vertebræ, in a minute or two. Our impression is that spondylotomy will, or ought to, lead to the abolition both of decapitation and, as a rule, evisceration—the one more difficult on the whole, and more protracted, and the other no less tedious. Some cases have been reported in the *Lancet*, and they were quite successful. There is one by Dr. Tucker, Feb. 18, 1871, and another by Dr. Orchard of Kingussie, March 11, 1871. Dr. Orchard wrote to me to say that he performed this operation so far back as the year 1847. The following is the doctor's account of his method of operating: "The arm presented, the liq. amnii had been long evacuated, and the woman had been many hours in labor, ere I saw her. I made several attempts to turn, but it was quite impossible, the child lying right across the uterus, rigid and immovable. I could lay hold of the inferior extremities, but no force could move the fœtus. I determined to deliver by cutting instruments. I used a pair of strong scissors, and introduced their point through one of the intercostal spaces, and clipped along the space to the spine, and with the scissors cut through the spine. I then seized hold of the feet, turned the

child with the greatest ease, and delivered the patient. She had a good recovery. I think the plan much superior to disembowelling the child and extracting it doubled, or tearing out piecemeal. When the spine was cut, it seemed to act like a hinge."

320. **Method of Operating.**—With a pair of strong, curved scissors, one of the blades being probe-pointed (the uterus being steadied, and the woman under chloroform), the spine is to be cut completely through at the nearest or most accessible point. We may have to reach it by cutting through the ribs, or clavicle or sternum, in some cases, but that is not a difficult matter. As far as possible, we should do the cutting, in order to reach the spine, subcutaneously. When this latter is cut through, and as much of the rest of the fœtal body as is needful, nearly all is accomplished. The lower part of the body will then come down, or may be pulled down, and after it the remainder, including the head.

After-Treatment in Embryotomy.—The after-treatment of embryotomy, including the foregoing operations, must be shaped to meet symptoms as they arise. In most of our own cases the treatment has been almost *nil;* only sometimes an opiate. The patient should have complete rest, and the soft parts and the bladder should be looked after. Watch vigilantly for abdominal pain of a steady and deepening character, and meet it by opium, etc.

CHAPTER XXIX.

OBSTETRIC OPERATIONS.—THE CÆSARIAN SECTION, OR HYSTEROTOMY.

321. We now arrive at the most serious of all the obstetric operations, because the most fatal to the mother. It is a very ancient operation, although the Greeks resorted to it only after the death of the mother; and it is probable that, in the case of the living mother, the operation dates no further back than the sixteenth century. Julius Cæsar came into the world through the abnormal avenue of a cut in his mother's abdomen, and many more great men, including Esculapius, are said to have been thus born. We are doubtful whether all who are said to have made their exit in this way have really done so, because invention and fable, credulity and superstition, were rife in those far-back times. It was believed in those days that all who were thus born were sure to attain renown; so it would readily come about that not a few heroes, or men of repute, would have their glory imputed to their birth. He is great, they would say, because he was born a "Cæsar," or a "Cæsone;" just as they would predicate of one actually born through the abdomen, (as Julius Cæsar was) that a career of glory was in store for him. Dr. Churchill, with his usual painstaking, has investigated one case, that of Edward VI. of England, and found it to be false. Edward, therefore, though gentle, promising and true, was only a spurious Cæsar.

The operation consists of an incision through the abdominal parietes and uterus, and the removal of the fœtus through the opening instead of by the natural channel.

This grave proceeding, usually fatal in Britain, though much less so on the Continent, has given rise to more serious discussion than almost any other one in obstetrics; and great diversity of opinion has prevailed as regards the cases and conditions justifying it, One side holds (and this is the view taken by the majority of British practitioners) that craniotomy is, as far as really possible—that is to say, wherever we can succeed in drawing a mutilated fœtus through the pelvis—preferable to the Cæsarian section; while the other, largely made up of Continental obstetricians, maintains that hysterotomy is to be preferred to embryotomy. The grounds of contrariety are largely based on a difference of opinion in reference to the value of the lives of mother and child. In Britain the mother's life is held as of higher value than the infant's; while, in France especially, and other parts of the Continent, this is denied, or it is, at least, alleged that we are incapable of judging of their respective worth. The question of the comparative fatality or mortality of the two operations has also weighed with many practitioners, both at home and abroad, and moulded their preferences either the one way or the other.

322. Instead of giving a long list of quotations from authors in illustration of the discrepancy which prevails, we shall simply give one or two from each side, and which embody pretty well the diametrically opposite opinions held. We place these by way of stronger contrast in opposing columns:

Dr. Osborn says: "The valuable life of the mother should never be exposed to absolute destruction by the Cæsarian operation for the safety of the child. The perforator should be had recourse to without reference to the life of the child."	Baudelocque alleges: "To mutilate a living child in order to avoid the Cæsarian section is the offspring of ignorance and inhumanity."
Smellie remarks: "When a woman cannot be delivered by any of the (other) methods recommended in preternatural labors, on account of the distortion of the pelvis, etc., in such emergencies, if the woman is strong, and of good habit of body, the Cæsarian operation is certainly advisable," etc.	Gardien says: "It is with good reason that prudent accoucheurs, in view of the fatal results of embryotomy, prefer the Cæsarian operation."
Blundell says: "It is an axiom in British Midwifery that we are never to deliver by the Cæsarian operation, provided we can in any way deliver by the natural passages."	Busch remarks that "the Cæsarian is the only practical method of delivery when the diameter of the pelvis (conjugate) is 2¼ in. or less; and it is indicated when the child is alive, and the same diameter from 2½ to under 3 inches."
Dr. Robert Lee recommends craniotomy in cases of extreme distortion, "whether the child be alive or dead," in preference to the Cæsarian section.	Weidemann recommends "the Cæsarian operation in every case where a living child cannot be delivered by other means," and he strongly condemns embryotomy.

Many more samples might be given to show how embryotomy is lauded in Britain, and the abdominal incision decried; and, on the other hand, how the latter is praised and the former condemned on the Continent, but there is not space.

323. **Statistics.**—Much valuable information has been gleaned, in regard to the fatality of this grave operation in relation to both mother and child. From Churchill we gather that of 450 cases, from various sources, where this operation was performed, 230 mothers were saved and 210 lost. Of 315 children thus delivered, 211 were saved and 104 lost.

Were we to judge from the above statistics, we would not be led to conclude that the operation was so very fatal after all; but unfortunately, when we come to look at the records of British practice, we have a dark cloud lined by a few silvery rays. Thus, in British practice, Dr. West places the mortality at about 83 per cent. True it is, and equally sad, that case after case has proved fatal in Britain; and the same may be said of America. One would almost imagine that there was some peculiarity in the Anglo-Saxon race, or in the climate of these islands and of America, inimical to its successful performance. It cannot be that our practitioners operate less dexterously; neither is it always owing to our longer delay, for some of the cases have been performed early, and under favorable auspices, and yet have proved fatal. We cannot but envy our Continental brethren, such as Kilian, who performed it four times on the same woman; and Stolz, who operated twice, also on the same woman, the last being also successful. We have sometimes thought that now, when we have such able operators on the abdomen amongst us, who cut it as dexterously as Addison examined it skillfully; men like Keith and Wells, Baker Brown and Clay; we might yet come to rival the luckier men across the Channel: that as British ovariotomy has gone up so brilliantly, so might British hysterotomy attain to equal lustre. We cannot see how this better fortune should not come into our hands yet; we have as good material to cut—as sound and vigorous constitutions to treat as they have elsewhere, if not better. Unless our past failures have been due to the operation having always been delayed, and Continental success has been owing to an earlier interference, the melancholy contrast as regards results is to us an enigma and puzzle. We suspect, however, that British failure has come of operation during exhaustion, and where, in point of fact, the exhaustion itself, apart from the operation, was almost enough to kill. This view derives support from recent successful instances in this country by Baker Brown, Spencer Wells, and others. Let us hope that future annals will be brighter than the past, and that this operation may more rarely than hitherto be only, as regards the mother, a surely fatal one.

324. **Cases Suitable for the Cæsarian Operation.**—This operation being of so formidable and fatal a character, renders it highly desirable, nay indispensable, to know when it is warrantable, as viewed from a British, and not a Continental standpoint. The operation is justifiable, then, in the following circumstances:

1. When the antero-posterior diameter of the pelvic brim is under one and a-half inches, for then most assuredly is embryotomy unsafe, if not impracticable.
2. When the mother dies undelivered, and version is impracticable. But it is often practicable here.
3. In ruptured uterus, when the child is yet alive, and version unsuitable.
4. In some cases of malignant disease of the uterus, where great obstruction is occasioned, and where incision and dilatation do not give us space enough to bring down safely the reduced head.
5. In cases of obstruction from osseous or other tumors of the pelvis, where embryotomy cannot succeed.
6. In extra-uterine pregnancy, where the life of the mother is threatened.
7. In extensive wounds of the uterus toward the termination of pregnancy.

We have said that this formidable operation is only to be undertaken when the conjugate diameter is under one and a half inches, because Dr. Barnes and others have succeeded in bringing a reduced head down safely where there was no more than this diameter; but we are not sure but that the German limit, 2.50″ (see Scanzoni's Lehrbuch der Geburtshülfe, 1867), is the more prudent one. The high distortion cases, where you have to drag the reduced head slowly and forcibly down, do not, as a rule, succeed well; but then, in the cases recorded, there has often been much delay before operating; and it were impossible almost to say whether the fatal termination was due to the operation or the procrastination. Still, we cannot share Dr. Barnes' belief, that a conjugate of 1.25″, or even 1, may be met with much greater safety by this method of embryotomy, or any other, than by the abdominal incision. Embryotomy, however, cannot possibly be more fatal than British hysterotomy; for, as before observed, its annals are but a record of almost unbroken failure, so far as the mother is concerned.

325. **Is Procreation Justifiable in Cases of Distortion Necessitating Hysterotomy?**—In addition to the difficult question of the warrantableness of this operation under any circumstances, there is another no less trying and insoluble to some minds—viz., whether the mother, after being made aware of the impossibility of a child, even in a mutilated form, being dragged through her fearfully narrowed passages, is justified in putting herself in the way of becoming pregnant. Denman, in connection with this matter, remarked as follows: "It might be doubted, in morals, whether children should be begotten under such circumstances."

Method of Operating, Instruments, etc.—The instruments required are, a sharp bistoury, and one with a blunt extremity; a director, artery forceps, ligatures; plenty of large sponges, and small ones on the end of sticks (the sponges should be new and clean); silver sutures, lint, plaster, many-tailed bandage, ether, chloroform or laughing-gas, and ice. Three or four assistants are also necessary.

The bowels should be freely opened, and the bladder emptied before beginning. The operation should be commenced early in labor, before the woman's strength is exhausted, and after the os is dilated a little. In cases where it has been resolved on, before labor, to incise, it is as well to excite labor, so as to open up the os a little for the escape of uterine discharge. This may be done by a sponge tent. The patient is placed on her back on a table, with pelvis a good deal raised, and the head and shoulders also elevated. Chloroform, or a mixture of this with ether, or ether alone, as recommended by Dr. Keith in ovariotomy, or, as some prefer, nitrous oxide, should be administered. The ether is said by Dr. Keith to be less liable than the chloroform to occasion vomiting, and this is a paramount advantage. The temperature of the apartment should not be less than 75° Fahrenheit.

326. An incision is made about eight inches long, and in the linea alba, to avoid hemorrhage and the dividing of muscles, stretching from the umbilicus to near the pubis. On cutting down as far as the peritoneum, this should be cautiously divided upon a director, so as not to wound the bowel. The uterus is now observable, and an incision should be made into it four or five inches long. This incision should not go completely through at once, but cautiously, so as to come upon the membranes. These are to be opened a little, and the liquor amnii absorbed with sponge, or withdrawn by means of a syringe. This is to prevent it discharging into the abdominal cavity. If we alight on the placenta, we must push it to one side. The child is then to be withdrawn as soon as possible, and afterward the placenta and membranes. Any

clots, etc., should be removed from the peritoneum and the wound, and we should see that the os uteri is pervious, so as to admit of discharge passing out. Some place a bit of ice into the uterus, through the wound, so as to arrest hemorrhage. As regards the uterine wound, some stitch it, others do not, but trust to the uterine contraction closing it. We believe it to be better to close it with silver suture. The external wound is also to be brought together by a close suture of silver wire, the stitches also passing through the peritoneum, and closing it. Should the intestines protrude during the operation, the assistants restrain them gently with warm flannel. A cold-water dressing is placed over the wound, and, above this, warm towels and flannel. An opiate is given, and perfect rest enjoined.

We should state that the credit of having first suggested the closure of the wound in the uterus is due to Spencer Wells. He first proposed it in 1863. He lays stress on this, and, undoubtedly, with good reason, as the uterine secretions are prevented thereby from reaching the peritoneal cavity. Mr. Wells allowed one end of the suture (silk) to pass through and hang from the cervix uteri, whereby drainage was maintained, and a hold got for removing the ligature, when, after several days, it is wished to do so.

Dangers of the Operation, Causes of Death, etc.—These may be summed up thus: Hemorrhage, shock, inflammation, exhaustion, strangulation of a bit of bowel in the uterine wound, if not closed, and vomiting.

327. The hemorrhage is often not great, unless the placenta has been implanted on the anterior wall of the uterus, in which case the cut will have traversed an area of increased vascularity. The stethoscope will give us an idea beforehand. If the placenta be more to the side, or, better still, placed posteriorly, little hemorrhage may be looked for. The inflammation arises partly from the wound, partly from foreign matter getting into the peritoneal cavity. Vomiting sometimes supervenes (but not so frequently with ether), and injures by loosening the sutures, and forcing fluids into the peritoneal cavity, as well as causing exhaustion. To avoid this, it has been proposed to use the ether spray, as originated by Dr. Richardson, or to give the nitrous oxide as an anæsthetic. The shock to the nervous system is often very great, but anæsthesia has diminished this considerably. Peritonitis was wont to be viewed as one of the greatest perils in connection with this operation; but after the grand results obtained by Wells and Keith, Brown and Clay, we can no longer so seriously apprehend it, that is to say, if the suture is made to embrace the uterine wound. One is almost tempted, keeping in view the glories of modern ovariotomy, to conclude that the peritoneum of the present day is made of different material; certainly women bear much more in the way of abdominal cutting. The explanation is this; the brilliant results are the outcome of greater skill, and the skill is in great part the offspring of more enlarged experience. Hippocrates believed in the fatal character of a peritoneal wound. What would he say now were he to arise from his long sleep in the tomb?

As regards the chance of a knuckle of bowel getting strangulated, this cannot readily happen if the wounds are carefully sutured. In numerous cases the uterine wound does not close, but remains patulous and everted. In the case reported by Dr. John Taylor (*Lancet*, Jan. 18, 1868,) it was unclosed six weeks after, at which time the woman died.

Post-Mortem Cæsarian Section.—There are numerous instances where the living child has been cut out after the mother's death. A notable case is that of the Princess of Schwartzenberg in 1810. She was at a ball in Paris, given by her brother, the Austrian Ambassador, when a conflagration occurred, and she met her death. On the following day a living child was removed from her belly.

The late Dr. Brotherston of Alloa performed it in 1868, on a woman who had been dead twenty minutes. The child survived.

Drs. Tixier and Sallath, Quebec, extracted a living child from the abdomen of a female who was killed by a coal cart going over her head (in 1867). The operation was done about thirty minutes after her death.

Other cases are recorded of success, after from twenty to thirty-five minutes.

CHAPTER XXX.

OBSTETRIC OPERATIONS.—SYMPHYSEOTOMY.

328. **Symphyseotomy; or the Sigaultian Section.**—This operation consists in making a section of the pubic symphysis, in order to enlarge the pelvic diameters, and, if possible, avoid the abdominal incision. The originator of it was a Frenchman, named Sigault, who, when a student, wrote a memoir on the subject. At first the novel proposal of Sigault was treated only with contempt, but gradually some supporters rallied round him. Among the latter was the learned Dutchman, Dr. Camper. This support, small at first, waxed greatly when Sigault, assisted by Le Roy, performed his own operation successfully. This was in the case of a woman named Souchel, who had previously borne four dead children. His fame spread with almost electric speed, and many declared that he had succeeded in banishing the cruel and barbarous operation of cutting into the belly. The enthusiasm was vast, but quite disproportionate; still, we cannot blame the enthusiasts, for there is always any amount of them on the appearance of any novel plan, tool, system, or medicine connected with our profession. A Sigaultian fever was quite as warrantable as a sulphur mania, or a chloral rage, if not a good deal more so. But all this confidence in the operation, all this acclamation, was destined to come to an end, and for the simple and sufficient reason that it was not worthy of it.

The object of the section of the symphysis was to increase the antero-posterior diameter, and thus permit of the passage of the child in cases where it could not otherwise pass, and thus give a better prospect of safety for both mother and child. But, unfortunately, little increase of space is obtained, and what is obtained is least where it is most needed. The augmentation of space is greatest in the oblique diameter; next in the transverse; and least in the conjugate, where it is most wanted. In this latter, half an inch is the utmost that can be got without unwarrantable force. Besides, this increase is not to be had without danger of injuring the sacro-iliac synchondroses. The pubic symphysis cannot separate unless the others also yield. From this it follows that the operation would not be practicable in anchylosis of these (false) joints, a condition obtaining often in pelvic distortion. Another argument against the operation is its fatality. It was fatal to the mother in 16 out of 40 cases, and to the child in 11 out of 30.

The operation, then, is not encouraged in this country, and few even subscribe to the opinion of Denman, that it might be performed in a case where the child (being alive) was of great importance to the nation. The mother, in such a case, he thinks, might fairly be allowed to take the risk.

The Dangers arising from the Sigaultian Section.—These are inflammation; risk of injuring soft parts of pelvis or the bladder; laceration of pelvic ligaments, giving rise to abscess; shock of the operation.

329. **Vaginal Hysterotomy.**—In addition to hysterotomy through the abdominal parietes, there is another operation which may sometimes be resorted to, viz., incising the os through the vagina. It is adapted to disease of the os uteri, or congenital closure of the same. Cancer, for example, may so indurate the os as to render labor impossible by the natural way, and the same is true of fibro-cartilaginous hardening. Cases of retroversion and anteversion are named, too, as suitable for this operation; that is, where it is found impossible to correct the mal-position; but we should imagine that this would happen rarely. In regard to retroversion, it cannot exist in the gravid state beyond the middle term of pregnancy, for the ascent of the womb will correct it; or, if it were persisting, it could hardly fail to lead to abortion. It is obvious that there is no room in the pelvis for a retroverted gravid uterus at the full time. The manner of performing this operation was stated under rigid os.

CHAPTER XXXI.

INDUCTION OF PREMATURE LABOR.

330. **Induction of Premature Labor.**—This operation is now an established one in obstetrics, although the morality of it has been questioned and hotly debated. Denman relates, in his System of Midwifery, that in 1756 a solemn consultation was held among the obstetricians of London as regards its utility, safety, and morality; and this does not excite our wonder; for although an operation of vast usefulness, conserving lives, and averting suffering, as it does, it is one that may be much abused. It may be both a moral and an immoral proceeding; moral when undertaken to preserve life; immoral when performed to avert reproach and shame from the guilty. Only those destitute of right principle would thus criminally act.

The utility of the operation was questioned, among others, by Baudelocque. It was said that the liquor amnii being evacuated, the uterus would contract firmly on the child, and as the os would only dilate slowly (as it does in these premature cases, from its incompletely developed state), the funis would be compressed, and the child would be sacrificed. Then it was said, and truly, that the presentation would be often preternatural, and thus the delivery would be difficult, and attended with danger. These objections will have no influence with us now-a-days, for the operation has been supremely successful. Indeed, it forms one of the most brilliant pages in midwifery. There are few busy obstetricians who have not obtained cheering results from it, sparing poor women the perils of embryotomy, and saving scores of children that otherwise would have been lost. The late Prof. Hamilton (see Pract. Observ., p. 285) saved 42 children out of 46; and we have derived much comfort from the operation, knowing the evils prevented by it. Our own list is also a large and encouraging one. We have had no fatal results as regards the mother. In reference to the compression of the funis, it may be stated that we do not need to evacuate the liquor amnii at all; and as regards the fact of preternatural presentation, it matters little, as we perform version in such cases wherever we can.

331. There is another objection to the operation, or difficulty in connection with it, worthy of notice, viz., that we are liable to be mistaken or misled in reference to the time of gestation at which we intend to operate. There is no doubt about the correctness of this, for women will make mistakes even in regard to this important matter; and if they have conceived during lactation, or in the absence of menstruation, they will be less qualified to calculate. It follows from this, that we may either perform the operation too late, and thus have to perforate after all, or too early, and thus bring a child into the world incapable of living. However, with care on the woman's part and our own, these untoward results may not come to pass. We have rarely miscalculated. Dr. Ramsbotham was only misled 5 times in 91 cases.

Another objection still may be referred to. It has been said that we cannot always easily ascertain the precise dimensions of the pelvic diameters, and, therefore, we might resort to the operation in some cases where it was unnecessary. This is a weak one. In pre-anæsthetic days it might have had more force; but under anæsthesia, the hand forms a correct and trustworthy pelvimeter. We may employ, along with it, Dr. Greenhalgh's flexible metallic ring. Besides, as Velpeau remarked: "If the pelvis be wider than we thought, premature delivery (at or after the 7th month) is done without risk. If, on the contrary, the narrowing be more considerable, the fœtus will certainly perish; but, then, had no operation been attempted until the full term, the fœtus would equally have been lost, and the mother would have run greater risk."

But however much truth there is here, it will not do for us altogether to shut our eyes to the fact that, unless the pelvis has been carefully gauged *with a skilled hand*, the patient being under chloroform, the operation may be performed when it is not required. Merriman most truly observes, "that the use of the perforator in a former labor is not *alone* to be considered as a justification of this operation." We strongly indorse this. We have known craniotomy performed more than once in cases where, during subsequent labors, living children came easily away. Still, we shall impeach no one for perforating with a conjugate of three inches or so; for big heads, and preternaturally ossified ones, will cast up at times, and compel us to the unwelcome task.

332. **Cases Suitable for the Induction of Premature Labor.**—Denman has well pointed out when the operation is to be resorted to in the following passage: "It is," says he, "under circumstances, and in situations preventing the successful use of the forceps, and just compelling us to the fatal measure of lessening the head of the child, that it may be a duty to propose, on a future occasion, the bringing on of premature

labor." There are other cases where the operation is called for, and these we shall enumerate. They are as follows:

1. In cases of distortion of the pelvis, where the conjugate diameter is so contracted as to necessitate embryotomy.
2. In fatty placenta—that is, where we have a history of the successive delivery of dead children due to this. In such cases, however, we would auscultate often, and operate only if we found the fœtal cardiac sounds indicative of approaching death.
3. In cases of severe vomiting, amenable to no treatment, and threatening to compromise the woman's existence.
4. In pelvic tumors, and abdominal ones gravitating into the pelvis, and leading to obstruction so great as to necessitate the reduction of the child.
5. In dyspnœa, arising from pulmonary or cardiac disease, pleuritic effusion, or aneurism, and threatening death from apnœa.
6. In placenta prævia, where the flooding is so profuse as to threaten destruction.
7. In uræmic convulsions, epilepsy, and some cases of uncontrollable chorea.
8. Where there is an irreparable rigidity, and extreme contraction of the vagina, and in cases where contraction has been detected only after pregnancy has occurred. It is deemed better to deliver prematurely than to undertake during labor any operation for occluded vagina.
9. In instances of fibrous tumors of the uterus, threatening to set up inflammation in the latter months of pregnancy. Here it is necessary, as when inflammation happens suppuration is likely to follow, and sometimes, in consequence, death after labor.
10. It might be necessary in a case of strangulated hernia, if the operation for the relief of the gut could not be performed without it.
11. In malignant disease of the uterus.

Methods of Inducing Premature Labor:

1. Agents which stimulate the uterus by being absorbed into the blood, such as ergot, borax, savin, Indian hemp, by acting through the excito-motory or reflex system of nerves, which includes various forms of peripheral irritation embraced below.
2. Puncturing the membranes, by curved trocar.
3. Dilitation of the os by tents, such as laminaria digitata.
4. Separation of membranes by means of the uterine sound, the catheter, bougie, or finger.
5. Cupping-glasses, or suction to the mammæ (Scanzoni's plan), or mustard poultices to the same.
6. Galvanism; the interrupted current (Hennig).
7. Distension of the vagina by a caoutchouc bag filled with water or air, as recommended by Braun of Vienna.
8. Distension of os by Barnes' bags.
9. Water-douche—that is, a stream of warm or cold water directed against, or, more preferable, within the os uteri, for ten minutes at one sitting, and then repeated in four hours (Kiwisch's method).
10. Plan of Lazarewitch—viz., injection of warm water up to the fundus uteri.

11. Puncturing the membranes with a stilette.
12. Introduction of a flexile bougie (oiled) high up into the uterus behind the membranes.
13. Abdominal friction over fundus (D'Outrepont).

Now let us glance at the respective merits of the above methods and means. The articles, such as ergot, acting on the medulla through absorption into the vascular system, are not very suitable here. Ergot was a favorite with the late Dr. Ramsbotham; but even he acknowledged that, though successful as regards the excitement of uterine contractions, it had in such cases a bad effect on the child. He found it more fatal than by the plan of puncturing the membranes. Let the student bear in mind that in these cases a great deal has often to be given to produce the desired effect. We are all in the habit of giving a little ergot when necessary, and without bad results. It is only when it is given often, and in large quantities, that fatal issues are brought about.

333. The method of puncturing the membranes is not now adopted. Its disadvantages are that by it we evacuate the liquor amnii, and thus subject the funis and placenta to a pressure likely to interrupt circulation, unless the child is speedily born thereafter; and it is not, as a rule, quickly born, for the os is usually slow in opening up. The plan, however, is very effectual in the way of inducing labor. The dilitation of the os by tents is an excellent method, and one worthy of adoption. This plan was first adopted by Kluge and Brunninghausen, and is much followed on the Continent. Tents, whether of compressed sponge or of laminaria, are introduced by means of a metallic director. This director is fixed in the aperture of the tent, and with the left hand we introduce it into the vagina, and up to the os. It is then guided in by a finger or two of the right hand, already in the vagina. There is no need for the speculum, although when first employed this was viewed as necessary. The tent swells and dilates the os, and uterine pains are set up at a period ranging from four to forty-eight hours. We may have to remove one tent and introduce a larger one at the end of eight or ten hours. The first tent should be as large as the little finger. After introducing it, we inject a little warm water into the vagina, to facilitate its expansion, the woman lying on her back, with hips raised, in order that the fluid may be retained for some time. One drawback to the tent is the great irritation and pain it occasions in some females.

334. The separation of the membranes of the ovum from the interior of the uterus was first recommended by the late Professor Hamilton, and the plan was adopted by him at the close of last century. It may be done with the finger (we have thus done it several times), in which case we may have to bear down the uterus well with the left hand on the abdomen, or insert the operating hand into the vagina. Sometimes we can reach high enough without this. If we cannot do so, we may use a catheter, or bougie (firm), or a thimble of gutta-percha fastened to the end of the finger. We are to dilate gently, and gradually separate the membranes from the cervix for about two inches. The pains will come on at a variable time. We have, however, by continuing to dilate, induced pains in a short time, and finished the labor before leaving the house; say four or six hours.

The air-bags are very effectual also, dilating the os gradually, and exciting pains. The great advantage of the air-bag, as well as tents and manual dilatation, is that we dilate the os and separate the membranes, as well as originate "pains;" and thus no obstacle to the descent of the child exists, as is the case when the membranes are perforated, or where the labor is induced by various other plans.

The application of a child, or suction-bag (Scanzoni's plan), etc., to the nipple is not always successful. Sir James Simpson said he had never seen it originate uterine "pains," although quickening and intensifying them. The abdominal manipulations of D'Outrepont and others are not very effectual either.

335. The plan recommended by Schöller, Braun, and Hüter, of irritating the vagina and os with a tampon, or a caoutchouc bag, or of dilating by those means, is not so satisfactory as by the tent. In many cases, however, as might be expected from the now well-known reflex influence exerted by the vagina, it excites labor. Kiwisch's method, by injections of water, if properly done, is sure to induce labor. The apparatus employed by the professor, as figured by Scanzoni in his Lehrbuch der Geburtshülfe, vol. iii., p. 54, consisted of a small square tin reservoir, fastened to the wall at a height of about ten feet; and from the bottom of it there hung down a tube which could be introduced into the vagina, so as to permit a continuous and pretty powerful stream of water to flow. This douche was recommended to be used twice a day, for fifteen minutes at a time. Labor supervened generally in from three to five days. The late Sir James Simpson substituted a Higginson's syringe for Kiwisch's box (see Obstet. Works, vol. i., p. 841), and it answered well. Sir James introduced the end of the tube, however, through the os uteri, and thus directed the stream of water directly into the uterus. In cases where the os uteri is very high up, or retroverted, a bent silver catheter may be added to the nozzle of the tube, and thus the orifice of the womb may be reached. Care should be taken, in using this method, not to rupture the membanes with the end of the tube; if we do this we reduce the method to the plan of puncturing the membranes. Kiwisch supposed that his plan operated by relaxing the soft parts; but in this he was mistaken, there being little doubt that it induces labor by a separation of the membranes. While using the syringe, the woman is brought to the edge of the bed on her left side. A vase or basin is placed on a chair in front of the couch, and this is both a receptacle for the water to be injected and that which returns. One or two disadvantages attach to the douche of Kiwisch. You may, by the force of the current, alter the presentation, making it a "cross" one perhaps; but this may be rectified by turning. Still, it is better to avoid inducing a mal-presentation. 2. One may separate the placenta, and give rise to flooding.

336. Passing up the bougie, or catheter, five or seven inches between the membranes and the wall of the uterus, is a proceeding that induces premature labor most effectually. It has the advantage of being simple and easy, and produces little pain or irritation; at the same time, uterine contractions are pretty quickly excited, and labor may be over twenty-four hours after. At other times a day or two may elapse.

The Method of Professor Lazarewitch, and the grounds for employing it, are as follows: He holds that the initial step in labor is the separation of the membranes, and that this separation begins at the fundus. His plan, therefore, is to effect this separation artificially, and at the part where Nature does it first, viz., the fundus. He uses injections of warm water for the purpose; and in order to reach the upper part of the uterus, he attaches a long tube to his syringe, and pushes it away up into the womb. He then injects from six to nine ounces of warm water, up in the direction of the fundus; and he alleges that one injection is frequently sufficient. This was the case in ten out of twelve instances reported by him. His plan was successful in inducing labor in a period averaging nineteen hours; and he had no maternal deaths and only one of the children was stillborn. Despite this success of the Professor, we do not see our way to recommend it, and for the following reasons: (1.) When you have pushed your tube so far up into the uterus, you have done quite enough to induce premature labor, without adding the injections. These latter are then altogether superfluous; in using them you are doing a work of supererogation. (2.) In thus pushing up the tube, you cannot easily avoid detaching a portion of the placenta (your tube being more powerful than the little flexible catheter), and you may readily break the membranes. (3.) Some fatal cases have been reported after the employment of these injections so high up, probably owing to the shock, or, if not, to the entrance of air. (4.) The injections themselves may produce seperation of the placenta, and thus give us that rather serious complication, accidental hemorrhage. Such are the chief objections that may be urged against the method.

337. The question of time is not of so great importance in cases of distorted pelvis, that is to say, a day or two more or less does not matter much; but in convulsions, or pulmonary or cardiac disease, with alarming dyspnœa, or in unconquerable vomiting, with critical head symptoms, we must seek the speedy evacuation of the uterus. What, then, is the quickest (and yet safe) method? For our own part, we would recommend, what we have now done on several occasions, that separation of the membranes be effected simply by the finger introduced within the os uteri. If your finger is not long enough to effect this in every case, you can affix a nipple of gutta-percha to it, or use the bougie, as Hamilton did. You should place the woman under the influence of chloroform, and continue to dilate the os uteri with the finger. This will promote the uterine contractions, as well as further expansion of the os. We have finished a labor in this way in a few hours. Where the case is not pressing, as before remarked, we need not hurry the labor, but, on the contrary, give time for the os to open up, etc.

338. **Mode of Delivery after Inducing Labor.**—It will depend a good deal on the presentation and the progress of the case, etc., whether we shall aid the natural powers or not, after exciting premature labor. If it be an urgent case, or an extremely contracted pelvis, we must proceed to version, either by the old method or that of Dr. Hicks. The forceps had better not be employed in such cases if it can be avoided, because the cranium is soft, and thus more easily injured. Still we may frequently have to do so.

Period of Pregnancy at which the Operation is to be Performed.—The time selected for operative procedure depends entirely on circumstances. If we had a case of cancer of the uterus, indurating the os immensely, and obstructing the passages, we might have to induce labor before the period of viability; say, even at the fifth or sixth month. In a conjugate under two inches we could hardly expect to delay much longer. We have now had not a few cases where craniotomy had been previously performed, and where we succeeded in delivering children at the end of the seventh month alive, and who lived. It is an operation, then, by which we may vastly diminish the number of craniotomy cases, and give children, otherwise doomed, to their parents and their country.

CHAPTER XXXII.

ON THE LIMITATION OF THE GROWTH OF THE FŒTUS IN UTERO.

339. It was suggested, many years ago, that in cases of moderate pelvic contraction necessitating craniotomy, or the alternative we have just been considering, we might succeed in checking the growth of the fœtus by giving the mother a somewhat spare and non-nutritious diet; and in this way it was thought we might render it so small and attenuated as to be capable of transmission (unreduced) through the pelvis. This would appear to be a plausible thing, but it has not succeeded. You may keep the mother on poor fare; you may half starve her, in fact, but yet her infant contrives to come home plump. You may attenuate the woman down almost to a mere bundle of bones, and yet the child arrives rotund, and padded with fat. We have known many females—those given to vomiting much—stint themselves greatly, in order to avoid the gastric pain and emesis occasioned after partaking of food; still, the fœtus showed no evidence of emaciation; it was no ape-faced thing, but well filled up, contented, and lively. We think, however, that a diet consisting largely of farinaceous foods, and contributing as little as possible of the elements which go to form bone, should be given where the woman is possessed of a contracted pelvis.

340. But if we cannot hope very much from the diet of a hermit even in such cases, is it not possible to do something in the way of limitation of growth by means of medicines? We believe that it is; that this method will prove more successful than the dietetic. M. Delfrayssé gave iodine internally for the last two months of gestation, and found it succeed. The children when born were small and loose-skinned. Doses of iodide and bromide of potassium, with liquor. potassæ, may also be administered. Begin at the period of quickening, and carry it on daily during the remainder of the period. If pain of the stomach should be occasioned, give liquor. bismuthi; and the iodine and iodide of potassium should be given in some infusion of calumba. If diarrhœa be set up to any serious extent, check it with opiates. These will also contribute to restriction of fœtal growth. We have noticed that the children of opium-eating women are, as a rule, lean, though not unhealthy-looking.

Does Opium, when given to the Mother, cause the Death of the Child?—Some believe that opium given largely to the mother tends to destroy the infant. Our own experience does not coincide with this view. We have known women take daily five to ten grains of hydrochlor. morph,, and yet produce healthy-looking children. At the same time, it has been found in some cases that a large dose of laudanum given during labor has apparently caused the death of the child.

CHAPTER XXXIII.

PARTURITION.—CLASS II. UNNATURAL LABOR. ORDER V. MAL-POSITIONS AND MAL-PRESENTATIONS.

341. **Diagnosis of the Different Presentations.**—Before noticing special mal-positions and mal-presentations, it will be well to make a few general remarks on their diagnosis.

Presentations may be divided into longitudinal and transverse, the former including all those where the long axis of the child corresponds with the long axis of the uterus, such as the head, or breech, or feet; and the latter, those where the long axis of the child lies at an angle to the long axis of the uterus, such as arm and shoulder presentations, back, side, etc.

Head.—The head may be made out by its roundness and hardness, its fontanelles and sutures, and at times by the hair.

Face.—The face, by its irregularity of surface, and by the nose, which crosses the os, as does the saggital suture in cranial presentations; also, the mouth, eyes, and orbital ridges.

Breech.—The breech, by its softness, by the cleft between the buttocks, by the coccyx lying behind the anus, into which one's finger can be introduced. The scrotum, or vulva, may also be felt.

Knee.—The knee, by its rounded shape, by the condyles of the femur.

Foot.—The foot, by its lying at a right angle to the leg, by its narrow heel, and the toes being of more equal length than the fingers, the great one not divaricating like the thumb.

Elbow.—The elbow, by the olecranon, which renders it sharper than the knee.

Hand.—The hand, by the unequal length of the fingers, and the divarication of the thumb, and being shorter than the foot.

342. **Causes of Mal-positions and Mal-presentations.**—These are mainly as follows:

(1.) **Prematurity.**—This may be owing to the fact before noticed, when speaking of the attitude, etc., of the fœtus *in utero*, that the child has not taken up its usual and common position with the head lowermost.

(2.) **Death of Fœtus in Utero.**—The maintenance of the position of the fœtus *in utero* is an excito-motory, and consequently, vital act. When it dies, this vitality, indispensable to a reflex act, is lost, and with it the normal position of the fœtus.

(3.) **Various Morbid Conditions of the Fœtus, such as Ascites, Hydrocephalus, and Spina Bifida,** *altering its form.*—These act probably by modifying or restraining the adaptive reflex movements of the fœtus. In cases of hydrocephalus, moreover, the cause may be partly also mechanical, for the enlarged head fits the broadest part of the uterine ovoid better than the pelvic extremity.

(4.) **Causes Physically Displacing the Fœtus,** such as redundancy of liquor amnii, or sudden rupture of the membranes.

(5.) **Plural Births,** by altering the shape of the uterus.

(6.) **Spasmodic Contraction in the Walls of the Uterus.**—When these contractions are local and limited, they alter the normal shape of the uterus. Dr. Rigby has observed (System of Midwifery, p. 169) that "cross-births" are frequently preceded by severe spasmodic pains in the abdomen. It is likely, however, that the spasmodic contraction may be a result of the transverse position of the fœtus, and not a cause, at least in some cases.

343. (7.) **Organic Diseases of the Uterine Parietes.**—Fibrous tumors, which do not always prevent pregnancy (although rather unfavorable to it), may cause mal-position, by altering the normal form of the uterus.

(8.) **Distortion of Pelvic Brim.**—Preternatural presentations are occasioned by pelvic contraction, especially at the brim. How is this? It is believed that it is owing to the interference with the expansion of the cervix offered by the narrow brim. In malacosteon and rickets (the diseases which commonly produce distortion), the trunk is generally also deformed—the ribs approach the pelvis more, and the abdominal cavity is more shallow. Thus there is less room above as well as below for normal uterine expansion. Laterally, however, it broadens out; but this is a shape physically adapted, not for the normal position of the fœtus, but for a transverse one. Hence "cross" births are common in extremely contracted brims, and in rachitic patients.

Change in the Normal Configuration of the Uterus.—The uterus is mis-shapen in some cases. There is a departure from the ovoid figure: it may bulge out toward the sides, and have its longest diameter in that direction, instead of vertically. As a consequence, when the fœtus endeavors to adapt itself, the long axis of its ovoid mass will be transverse, and not perpendicular.

Double Uterus.—Here the side or horn containing the fœtus is sometimes of an irregular shape, necessitating the child to become correspondingly irregular.

Accidental Causation of Preternatural Presentation.—Falls, jumping, running, carriage exercise, etc., induce mal-position in some instances. We may state that a breech case we had lately was one where the lady had shortly before arrived in this country from the East Indies, and experienced rough weather, with a great deal of rocking of the vessel on the way. Her previous labors were natural.

Placenta Prævia.—Placenta presentation is another cause. It interferes with the usual ovoid figure of the normally expanded uterus, and thus the fœtus, in adapting itself, does so in accordance with this altered form.

On the Tendency to a Recurrence of Mal-presentations in the same Female.—Cases are reported where women have had numerous mal-presentations in succession, and often of the same kind. Madame Renard published (Gazette des Hospitaux, April, 1849) a case where a patient had the right shoulder presenting in five successive pregnancies; the pelvis was contracted. Walther records a case where the same presentation occurred six times. We have many patients who regularly mal-present. The cause of these successive mal-presentations is very probably due to deformed pelvis, leading to an alteration in the ovoid figure of the uterus of a similar nature each successive pregnancy.

344. **Face Presentations.**—In this presentation the head gets extended instead of being flexed. In the first position the forehead is to the left acetabulum; in the second, to the right; in the third, to the right sacro-iliac synchondrosis; and, in the fourth, to the left. We may thus have the forehead as the analogue of the four vertex-presentations. The most

common are the first and second positions; the others seldom occur. Face presentations happen rarely. Churchill says once in 231⅔ cases. Hecker says that the proportion is 1 in every 168. We shall notice this discrepancy presently.

Causation.—Dr. Ramsbotham thinks that face presentations are originally brow ones, and that the change is effected by the uterine contractions acting strongly on the fœtal body, and pressing down the shoulders. The occiput remains fixed, or hitches, and thus the chin is gradually separated from the chest. Dr. Hecker of Munich shows (Ueber die Schädelform bei Gesichtslagen, Berlin, 1869) that the large majority of children born in this way were dolichocephalous; that is to say, the skull is prominent posteriorly, its height is under the average, and the parietal bones are narrow, and bulge but little. The occiput also projects, as pointed out by Matthews Duncan (see paper Edin. Med. Jour., May, 1870, and omitted by Hecker). Is this dolichocephalous condition, then, a cause of this mal-presentation, or merely a consequence of it? Hecker does not distinctly say that it is a cause, though there are indications that he believes it to be an important factor. Dr. Duncan has described the mechanism of these cases, and he believes that this form of cranium contributes to the production of this mal-presentation; but there are other causes operating, such as the curvature arising in many instances from the right lateral obliquity of the uterus. This curvature operates at the brim, where it is believed that the mal-presentation is initiated. The mechanism, then, is—the child is forced down by the natural powers, but owing to the increased length of the posterior cranial lever-arm, the occiput dips less than it does in normal cases, or, in other words, it advances too little, and the forehead advances too much. This abnormal advance of the forehead may not go on to a great extent, owing to the yet greater length of the anterior cranial lever-arm; but if the usual resistance offered by the soft parts is lessened or removed, as it is in extreme right lateral obliquity, then the forehead will dip unnaturally, and the occiput descend too little, until complete extension of the head is produced. Viewing this right lateral obliquity as a co-operating cause, the position of the women in this country during labor—viz., the left lateral decubitus—will help to account for the smaller number of cases met with here; while the dorsal decubitus, which we know is very common in many parts of the Continent, may explain the greater frequency of the mal-presentation there.

345. **Mechanism of the First Position.**—Here the forehead is, as before stated, toward the left acetabulum, and the chin toward the right sacro-iliac synchondrosis, the bridge of the nose crossing the os, as does the saggital suture in a vertex case (1st cranial). The right side of the face points anteriorly, and is more depressed than the other in entering the brim. On making an examination, the finger impinges on the right eye or zygoma, and on this part we have the primary tumor. If it advances slowly through the pelvis, we will have the tumefaction on the inferior half of the right side of the face (part of the right cheek). The chin takes a turn when in the cavity of the pelvis from right to left, and emerges obliquely under the arch of the pubis, while the vault of the cranium glides over the perinæum.

Second Position.—Here the forehead points to the right acetabulum, and the chin to the left sacro-iliac synchondrosis. The primary tumor is on the upper part of the left cheek, and the secondary (if there has been great resistance) on the lower part of the same. The chin makes the quarter turn from left to right anteriorly, and makes its exit under the pubic arch.

The older authors thought that in these cases the head emerged from the lower outlet, with the chin towards the perinæum; and Smellie has actually figured it as in this position. But this is a mistake, because physically impossible.

Statistics.—We have alluded above to the rarity of the presentation. As regards its influence on the mother, in 160 cases, 3 died; and in reference to the child, 1 in 7 were lost.

The diagnosis has been previously alluded to. In examining with the finger, we should take care not to injure the eye of the child.

Treatment.—A face presentation gives us a tardy labor; it may drag its slow length along in the second stage for double or treble the ordinary time. This is owing to the incompressibility of the bones, which pass first through the pelvis, and no moulding or adaptation can take place. The mother naturally suffers more. The child's face is often much disfigured by the compression. If the case were to go on so long as to threaten exhaustion, we would have to apply the forceps, and this is not difficult. However, if we exercise a little patience, a quality often as indispensable to the accoucheur as decision, the natural powers will accomplish the task unaided by artificial means.

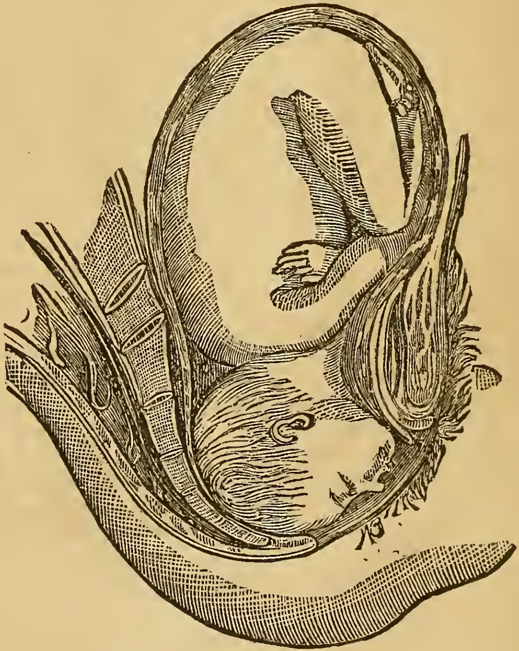

FIG. 52.

Sometimes the tumefaction of the child's face is so great that a little evaporating lotion may be required, such as a solution of chloride of ammonium in water, with a little spirit added.

346. **Brow Presentation.**—Brow presentation is a middle position

between flexion and extension of the head or between a vertex and a face presentation. As before remarked, there is a tendency for brow cases to become face presentations.

The brow may offer itself in any of the directions common to the vertex—that is, to either acetabulum or sacro-iliac synchondrosis. Much more space is required than when the vertex presents—nearly an inch more in the longest diameter.

Brow Presentation with the Face forward.—The anterior fontanelle may present with the face looking forward to one acetabulum, or another. This is less favorable than when the brow looks to either sacro-iliac synchondrosis, because the forehead does not mould into the arch of the pubis.

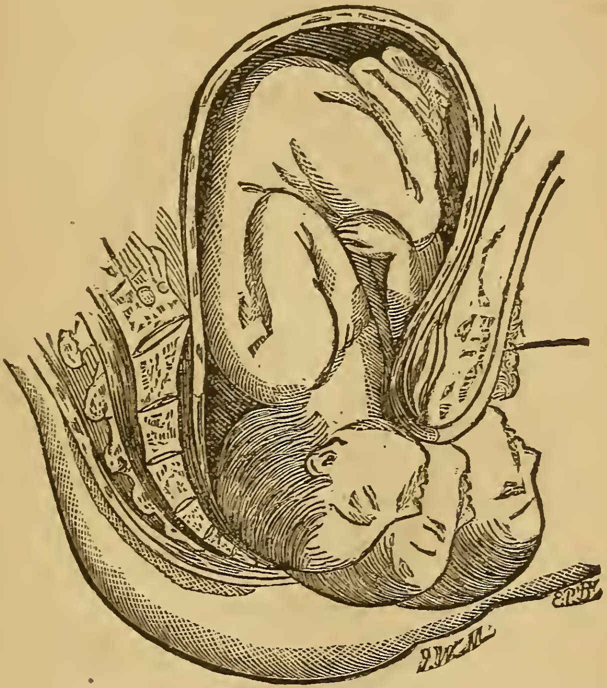

FIG. 53.—Passage of Head through External Parts in Face Cases.

Diagnosis.—It is known by the flatter shape of the forehead, which does not fit into the pubic arch so well as the posterior part of the head. Then the larger fontanelle is anterior, and the smaller posterior.

Symptoms and Treatment.—In some cases there is only a little longer delay than in vertex presentation. In others, where the pelvis is rather under the average, the forceps may be required. Even craniotomy has had to be resorted to. There will always be more delay and suffering, because more room is required, but the natural powers frequently prove sufficient. Dr. Ramsbotham says that we may succeed at times in correcting this presentation. We have done so. Counter pressure should be tried, during a pain, on one side of the brow, just above the temple, In this way the chin may be prevented from passing downward; the face may be forced backward, and the vertex enabled to descend.

Brow Presentation, the Face pointing diagonally backward.—Here the saggital suture can be traced running from the anterior fontanelle, forward and upward, in the direction of either acetabulum. The delay here is not so great as in the previous case.

Ear Presentation.—This is one. We can easily make out an ear; there is no other part like it. The helix may be felt, and behind it the occiput.

Treatment.—Wait patiently, and if Nature is inadequate to the task, let Art step in.

347. **Pelvic Presentations—The Breech.**—This is one of the most common of the preternatural (?) cases. The breech may present itself at the brim in various positions, but usually the dorsum of the child looks toward the back, or to the abdomen, of the mother—abdomino-anterior and dorso-anterior. In these positions the back of the fœtus is situated neither perfectly anteriorly nor posteriorly, but somewhat obliquely, one hip being more anterior than the other. The dorso-anterior is more frequent than the other in the ratio of three to one (Naegelé).

Statistics.—Breech cases occur about 1 in 60. About 1 in 3⅓ children are lost.

Mechanism.—In the first position the left ischium corresponds to the left acetabulum, and, being anterior, lies lowest, and presents at the os. On examining, our finger in the centre of the os touches this part. The breech descends in this oblique position, and it is this part that escapes first from between the labia, the other ischium gliding over the perinæum, and the abdomen of the child being toward the inner surface of the right thigh of the mother. As the breast approaches the lower outlet, the shoulders pass through the upper pelvic outlet in the left oblique diameter. Sometimes the arms are pressed close to the breast and side of the child; but at other times one or both may be extended above the head, and it may be necessary to bring them down. While the shoulders are descending in the above named oblique position, the head, which, during the whole progress of the labor, rests with its chin upon its breast, presses into the superior pelvic aperture, in the direction of the right oblique diameter (that is, with the forehead pointing to the right sacro-iliac synchondrosis), and then into the cavity of the pelvis in the same direction, or in a direction more approaching the conjugate diameter. After this, it presses through the external passage and the labia in such a way that, while the occiput rests against the os pubis, the point of the chin, followed by the rest of the face, sweeps over the perinæum as the head turns on its lateral axis from below upward. It is to Naegelé that we owe the most valuable facts in connection with this mechanism.

In the second position, the right ischium points to the right acetabulum, is turned forward and depressed, passing obliquely through the cavity and outlet as in the previous instance; but with its anterior surface directed toward the left side of the pelvis, and left thigh of the mother, whilst the head enters in the left oblique diameter.

Diagnosis.—The breech is easily made out by the marks given before. It has been confounded with a face presentation. In the latter we have the bridge of the nose lying obliquely across the os. The mouth has been mistaken for the rectum, but in the breech case there is the coccyx joining the sacrum. Another point in breech cases is the coming away of meconium. It is sometimes found on the end of the finger after examination. We have meconium coming away even in some cranial cases, but, as Collins has remarked, in these latter, it is in a more fluid state, being diluted with the uterine and vaginal discharges.

348. **Management.**—Many breech cases do well enough, the labor being only more protracted. If the pelvis were a little contracted, the case might go on until the symptoms of powerless labor set in, unless assistance were rendered. In a presentation of this kind, we should, especially in our examination, endeavor to avoid rupturing the membranes. The breech does not dilate the parts so well as the bag of membranes; therefore, let us get all the benefit from this latter that we can. Some of the older authors converted breech cases into footling. Dr. William Hunter, at one time, did this also. This was a blunder; for, although in this way we secure a good hold, and can employ traction, unless we are able to deliver speedily, we destroy the child by compression of the funis. The reason is, that the breech dilates the passages better than when the legs are brought down, presenting, as it does, with the legs up, greater diameters, and occupying more time. There is less objection to drawing down one leg. We have done so with advantage, instead of using the blunt hook. The plan, then, with breech cases, is to trust to the natural expulsive efforts until the body comes down as far as the navel, protecting the perinæum, however, as the breech makes its exit, and helping the flexion of the trunk. We may then relieve the funis a little by pulling it gently down. The remainder is as in a footling, and which we have described at length under Version. If the breech does not come down within a reasonable and safe time, we step in with artificial aid. The forceps may be used, but they are apt to slip. It is common to use the blunt hook (placing it over the groin) or a handkerchief, or the finger. This latter is preferable to the hook, for the soft finger will not bruise like hard steel. We have never had to use the hook in a breech case. The mortality to the children seems very high. With experienced practitioners, we are certain it is much lower. Of course, much depends on the dimensions of the pelvis, or, what is the same thing, the bulk of the child. But with an ordinary pelvis, and an average fœtus; taking care not to rupture the membranes early; giving a good deal of time until the body is expelled as far as the funis, then drawing down a loop of the cord, and placing it on either side of the sacral promontory; moreover, not hurrying the descent of the shoulders and head so long as the cord pulsates pretty strongly,—with these precautions, fœtal mortality will be lessened. Of course, if the funal pulsation ceases, we will expedite the delivery of the shoulders and head. There is nothing more certain, then, than that an impatient hurrying of a pelvic presentation—the tearing it away rudely—is fraught with the utmost danger to the child.

349. **Presentation of the Inferior Extremities; Footling and Knee Cases.**—This mal-presentation has been divided by Naegelé into two classes—(1.) With the toes directed backward. (2.) With the toes directed forward. The first is the more common. These cases have a mechanism similar to the two classes of breech presentation noticed.

Statistics.—Taking British, French, and German practice, we have, according to Churchill, 1 footling (and knee) in every 105 cases. As regards the fœtal mortality, it is 1 in 2½.

Diagnosis.—Frequently in these cases the liquor amnii is evacuated early; and on examination we miss the round, hard head, at the pelvic brim. When a foot comes down, we have little difficulty in knowing it, by the touch and handling. Its points of contrast with the hand we have noticed before, as well as the difference betwixt knee and elbow.

Management.—There is more risk to the child here, owing to the passages not being so well dilated, the legs obviously being less bulky than legs *plus* breech. The danger, as before stated, arises from the pressure on the funis. Under turning, we have treated fully of the management of such cases. We should take scrupulous care not to hurry the labor, unless the pulsation of the funis becomes very feeble, or ceases. If it pulsates well, we need not be impatient; if it beats feebly, the labor is to be hurried. But, in doing so, we must keep in mind all those hints about pulling in the direction of the pelvic curve, referred to when speaking of version.

CHAPTER XXXIV.

TRANSVERSE PRESENTATIONS, OR CROSS-BIRTHS.

350. When the long diameter of the fœtus lies across the uterus, instead of in correspondence with its long axis, we have transverse or "cross-births." In cranial and pelvic presentations, the long axis of the fœtus is parallel with that of the uterus, and in those cases the natural efforts are usually sufficient to effect delivery; but in transverse presentations unassisted Nature is rarely equal to the difficult task. It would not be very easy to tell before the commencement of labor, whether the fœtus lay transversely or not; still, we do not agree with those who deem it impossible. To those who accustom themselves to a good deal of external abdominal manipulation, the diagnosis is arrived at with less difficulty. In a thin individual we can grasp and define the fœtus pretty well, and then there is the alteration in the figure of the uterus, the long axis being horizontal, instead of vertical. At the same time, we may often be misled; for a hydramniotic condition may alter the shape of the uterus, as also irregular development of the uterine fibres, and plural cases—twins, etc. But granting that we were able, by abdominal manipulation, aided by auscultation, to tell beforehand the kind of presentation, that is, whether a "cross-birth" or not, there is this to be said, that we do not often have the opportunity; for our first summons is usually after the labor has been initiated.

351. **Presentation of the Superior Extremities. Shoulder and Arm.**—The hand, arm, and elbow may be classed with the shoulder, for in these latter it is often the shoulder that first presents.

All these, indeed, are usually termed arm presentations.

In arm presentations there are two positions spoken of; the first, where the back of the fœtus is toward the abdomen of the mother (fig. 54, dorso-anterior), and the second, where the back is toward her spine (dorso-posterior, fig. 55). The dorso-anterior is fully twice as frequent as the other. There are four sub-varieties of position in arm cases, depending on the situation of the fœtal head, which may either be on the right or left side of the mother. In the dorso-anterior position, with the head on the left side of the mother, the right shoulder or arm presents; while if the head be towards the right iliac fossa, the left arm or shoulder will be the presenting part. In the abdomino-anterior positions, when the head is to the mother's left, it is the left arm that presents; and when it is to the right, it is the right arm. In the former, or dorso-anterior positions, the head and arm are right and left: in the dorso-anterior they are right and right, and left and left; this merely as an aid to memory.

Statistics.—Rather more than one-half of the children are lost in presentation of the superior extremities. As regards the mother, Dr. Churchill says "that out of 282 cases 30 were lost, or 1 in 9." This is a remarkable mortality, and cannot surely be borne out by the experience of a skilled accoucheur of the present day, and with the modern helps of chloroform and the cephalotribe. We mention this latter because version is not always practicable.

Diagnosis.—Very often in these cases, unless the hand prolapses, we are led to suspect a cross-birth, by finding a difficulty in reaching the presenting part, even after the continuance for a considerable time of strong pains. By bearing down the uterus with the left hand, while we examine with the right, and if the os is opened up a good deal, we will come upon the presenting part; but if the membranes are entire, we tell with less ease the nature of the presentation. Sometimes the unbroken bag prolapses, of a conical form; and it has been known, where very firm, to have been actually mistaken for a limb of the foetus. When by the uterine contractions the shoulder is forced down a little way into the pelvis, we may get a finger into the axilla: the shoulder is also, as previously stated, rounder than the elbow, and lacks the condyles of the humerus. The distinction between hand and foot has already been pointed out.

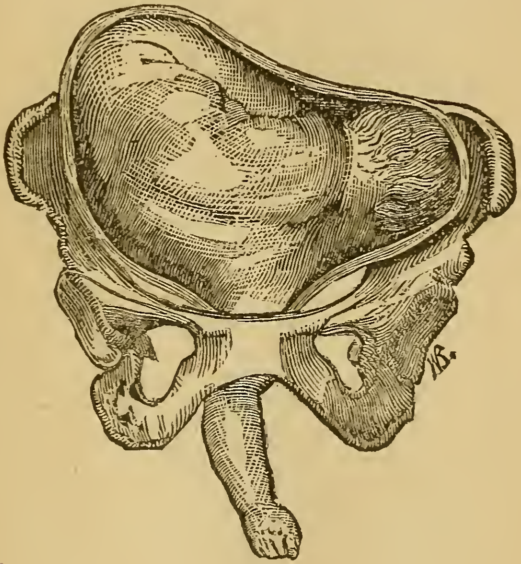

FIG. 54.

352. **Management of Arm Cases.**—Here, as in breech cases, it is of paramount importance to preserve the "bag of waters" as long as possi-

ble; indeed, it is more required here, because version has to be performed. Delay, however useful in many other instances, is entirely out of place here, for the more delay the more danger. We may wait a little until the os uteri dilates, say, to the size of a florin—that is, if the membranes are entire; but so soon as there is a fair prospect of getting the hand into the uterus, we proceed at once to turn. If the membranes have been ruptured before our arrival, we will then use all expedition, the patient being placed under the influence of chloroform; for every minute after this tends to aggravate the presentation, by pressing the shoulder deeper into the pelvis; at the same time, the uterus grasps the fœtus with increasing tightness and force. Moreover, the contractions of the uterus assume a tetanic character; there are no intervals between the pains; and thus, on examining, we find the child encircled and clutched almost as in a vice. We could not think of attempting version with the uterus in this spasmodic condition. First give half a grain of tartarated antimony, then place the female under chloroform. This may relax the uterine spasm, and enable us to turn. We are not, however, to force the hand recklessly in. If we meet with great resistance, we will desist from the attempt, although with profound reluctance, knowing that the other alternative is embryotomy. The only thing that will mitigate our grief will be the consideration that, in all probability, the severe uterine spasm has already killed the infant by compression; and thus we plunge the perforator not into the living, but the dead.

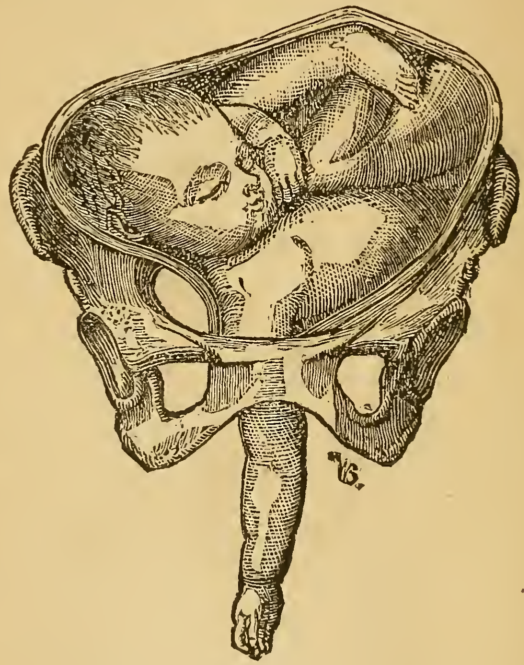

FIG. 55.

353. Failing to turn, then, in transverse cases, with the liquor amnii long drained away, and the womb in a state of tetanus, we must have

recourse to spondylotomy or decapitation, both of which operations we have already described. Some of the older authors managed shoulder cases, with the arm protruding, in a stupid and reckless manner. Modern accoucheurs do not heed the arm, they pass their hand up by the side of it, and do not dream of making it recede. Our ancestors, on the contrary, either reduced its size by incisions; twisted it off altogether, or pulled strongly at it, in hopes of thus effecting delivery. Daventer pinched it and pricked it, thinking that the child would in consequence withdraw the arm—a strange fancy. Others used ice with the same view. You can see that the bright star, Naegelé, had not arisen then; that the mechanism of labor was little understood. When you pull at a presenting arm with force, the result is, not the delivery of the child—certainly not—but the severance of the arm, and (unless he balance himself well) the prostration of the stupid operator on the floor, with the bleeding limb in his hapless clutches. We reported a case of this kind in the *Lancet*, 1870. The practitioner was not, of course, one of the modern school.

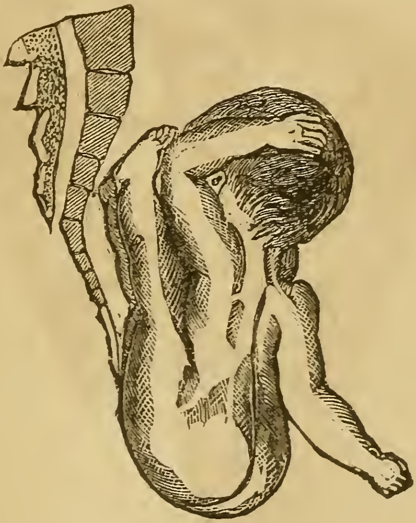

FIG. 56.

Dr. Churchill remarks on the difficulty of extracting the head after decapitation, and indicates a preference for evisceration. We can hardly agree with him, for, now that we have suitable cephalotribes, much less difficulty is experienced in seizing the head, and delivering it.

354. **Spontaneous Expulsion.**—Although shoulder presentations as a rule demand artificial assistance, some of them terminate with the delivery of the child spontaneously. Such a result implies immense uterine effort, and not only that, but a tolerably broad pelvis, or what is tantamount to that, a small child. A hundred years ago, Denman noticed the fact of unassisted expulsion in these cases. He imagined that during an interval of uterine relaxation, the shoulder and arm receded, and the breech came down into the pelvis; and, therefore, he called it "spontaneous evolution of the fœtus." This was correct, so

far as some cases are concerned; but there is another way, and which is more common, viz., that so ably described by the late Dr. Douglas, sixty years ago. Dr. Douglas first showed that the superior extremity did not recede, but that the clavicle presses against the pubis externally, with the acromion stretching toward the mons veneris. The strong uterine contractions force the pelvic extremity of the child, the loins and nates, down into the pelvis, and gradually down upon the perinæum, which is distended exceedingly, until ultimately the fœtus is expelled doubled. (See fig. 56.) The superior extremity then does not recede, but, on the contrary, the shoulder becomes pressed up, and fixed under the pubic arch, this latter being a fulcrum on which the child turns. As before said, either a small child, or a large pelvis, and strong uterine action are indispensable to the expulsion; and it is a mode of delivery, therefore, to which Nature must in many cases be quite inadequate. The lesson is, that we are never to delay operative interference in expectation of so unusual a delivery. Besides, it is one engirt with dangers. There is the sacrifice of the child (which early version might save); there is risk of laceration of perinæum, and other parts; and even the uterus itself may be ruptured by the tremendous force of the contractions, excited by the difficulties—the obstacles—of the case. These contractions are really severe. It has been our lot to have to deal with those cases. The pains were terrific, and sufficed to expel a dead child by the Douglassian plan. A last risk is that attendant on the use of cutting instruments, but, with care, this need not be great.

355. **Side Presentation.**—The side of the infant may present. We may know it by the ribs; and then, of course, there are no sutures or fontanelles. Two ribs and an intercostal space being felt, we can hardly mistake it for the head. In such a case we must perform version.

Back Presentation.—It is very rare to meet with a presentation of this kind. We may make it out by feeling several of the spinous processes of the vertebræ, the origins of the ribs, and perhaps the scapulæ. Here we must also perform version, or, if this be impossible, spondylotomy.

Presentation of Sternum.—This is a still rarer case. In some of these presentations difficult to make out, such as this one, we should anæsthetize the patient, and introduce the left hand high up. We may then make out more clearly the true nature of the case, and happily, also, be able to treat it at the same time by version. In this case we would feel the sternal bones, the cartilages of the ribs, and the intercostal spaces.

Presentation of Abdomen.—This is the rarest of all the transverse cases, and occurs only about once in nearly 200 cross-births. It is as well that it is so, for in some cases we might not be able to reach a foot, and turn without a deal of difficulty. The presentation is not difficult to diagnose, because we would feel the insertion of the cord. We must turn, or cut our way through the spine.

Compound Presentations.—There are various compound presentations met with occasionally, such as a hand and arm, or the feet and hands, or the funis, feet, and hands together. A head, a foot, and a hand have also been met with, and the forearm placed across the back of the head and neck (nuchal hitching of arm). Version is here the proper procedure.

Hands, Foot, and Funis.—Here we would grasp a foot and bring it down, endeavoring, by counter-pressure on the head, externally or internally, to make it recede. Unless we do this, the evolution of the fœtus may be difficult.

Head, Foot, and Hand.—Seize the foot, and help up the head by counter-pressure, if necessary, letting the hand alone. In a case where the hand descended along with the head (reported by Dr. Gray in the Edin. *Med. Jour.*, Jan. 1851,) the hand was forced through the vagina, and into the rectum. This case is not a solitary one.

There are two consolatory facts connected with compound presentations—viz. (1.) They are pretty rare; and, (2.) When they occur the pelvis is usually found very large (this amplitude, in fact, permitting the tumbling down of parts pell-mell,) and thus we have more space for operative procedure. We need scarcely add that an early diagnosis is of vast importance, enabling us, as it does, to operate, if possible, before the aqueous bag is ruptured.

CHAPTER XXXV.

PARTURITION.—CLASS II. UNNATURAL LABOR.—ORDER VI. PLURAL BIRTHS AND MONSTERS.

356. Gestation in the human female is usually single, but when plural, the number is rarely more than two. Churchill has collected an immense number of cases, in Britain and on the Continent, and he finds that we have twins once in 83 cases, and triplets only once in 7443. It is somewhat singular that plural cases are more frequent in some countries than in others. In Ireland and America they are more numerous than in England or the Continent of Europe. Quadruplets are still scarcer than triplets; and five still more so. Haller correctly observed: "Non raro femina geminos fœtus parit; rarius paulos tres, neque unquam supre quinque."

In reference to the causes of plural pregnancy, there has been no little speculation. There is a redundancy of reproductive power on the part of either parent. Excessive fecundity runs in families—it is hereditary; and it is common to confine the same woman successively of twins. Schröder has stated very concisely the causes. He says (p. 34 of his excellent work):

"1. From one ovum several fœtuses develop. The ovum, then, contains either two germs which, fecundated at the same time, continue their simultaneous evolution, or one germ has by division given rise to the formation of several fœtuses.

"2. One Graafian follicle may contain several ova, which, after the rupture of the follicle, are fecundated at the same time.

"3. Several Graafian follicles, either of one or both ovaries, may simultaneously rupture during menstruation, and the expelled and fecundated ova develop together in the uterus.

"The relations of the membranes also vary according to the different origins of the multiple pregnancy.

"The decidua vera, which is nothing else but the proliferating mucous membrane of the uterus, must in all cases of multiple pregnancy necessarily be common to the several fœtuses, because the mother has only one uterus. The only exception is in cases of uterus bicornis or septus.

"The decidua reflexa is simple when the several fœtuses are derived from one ovum, or when the several ova have been imbedded in the mucous membrane in close apposition. If the ova adhere to several places, each one is covered over by the proliferating mucous membrane, and thus obtains a separate reflexa.

"The fœtuses have the same chorion if they are derived from the same ovum; those from different ova have always separate choria, which may, however, greatly atrophy at the place of contact of the two ova.

"The amnion, which is formed neither from the mother nor from the ovum, but from the embryo itself, and is only the prolongation of the abdominal walls of the embryo, must consequently be multiple in several fœtuses. In rare cases, two fœtuses are found lying in one amniotic cavity. Then the vessels of the umbilical cords of the two fœtuses are for some distance from the placenta covered by the same amnion, so that the cord with two sets of vessels at the placenta divides into two at some distance from it.

"The cases of simple amnion may partly depend upon laceration and subsequent atrophy of the originally existing septum. But where the twin pregnancy is due to the division of the germ, the full development of the two amnia may have been equally impeded by a close approximation of both embryos, as under like circumstances double monsters are formed.

"The placentæ are also originally always separate, since in all those cases each embryo forms its own allantois, which, independently of the other embryo, grows toward any spot in the periphery of the ovum. In different ova they may, but in a single ovum they always must, be so close together that they more or less intimately coalesce. In the simple ovum there is, according to Hyrtl, always an anastomosis between the umbilical vessels or the embryos.

"Triplets also may form in the various ways mentioned above. Credé showed a triplet ovum with a common chorion; Pflüger, Grohé, and Schrön have found three ova in one follicle; and Scharlau showed a triplet ovum, each of which had a separate chorion and also a separate placenta. More frequently triplets develop from two ova."

Statistics—Mortality.—A good many children are lost in plural cases; about one in four. But, then, this is not the result of the labor, because many had perished before it set in. It is found frequently that one child develops normally, and the other not; its growth becomes arrested, and it may then be born dead, or a feeble and puling thing. The one, as regards development and growth, is independent of the other; and this has been strikingly illustrated in some cases, where one had disease, such as small-pox, *in utero*, and the other was exempt.

The mortality, as regards the mother, is stated to be about one in thirty.

Twins are in general of opposite sexes; but where they are the same, it is found that twin-males preponderate. Males are more liable to be born dead than females.

357. **Symptoms and Signs of Plural Gestation.—Multiple Pregnancy.**—It is said that we cannot diagnose a plural case prior to labor; but although we grant this to be difficult, we do not think that it is impossible. As we remarked before in regard to the diagnosis before labor of the position of the fœtus, careful abdominal manipulation, palpation,

and auscultation, such as that so skilfully conducted by Braun, Scanzoni, and others, will help us greatly. The following are the chief diagnostic signs and symptoms of multiple pregnancy, although it is not of much importance to be able to make it out:

1. More rapid expansion of the abdomen of the mother.
2. Obliquely or longitudinally placed furrow, or indented line, on the abdomen.
3. Perception by the mother of two separate fœtal movements at the same time, at different parts of the abdomen.
4. Along with the longitudinal sulcus, increased lateral measurement of the uterus.
5. Two distinct fœtal cardiac pulsations.
6. Aggravation of some of the disorders attending the gravid state, such as irritable stomach, back-pain, down-bearing, œdema of legs, etc.

Position of Twins in Utero.—The most frequent presentations are, the one cranial, and the other pelvic, or footling, This position of the twins seems best adapted to the normal ovoid of the uterus. In 1615 cases reported, there were 1084 cranial, 498 pelvic, and 33 transverse.

358. **Management of Plural Birth.**—Twins are often delivered by the natural powers quite unassisted. The labor may be more tardy, owing to the greater distension of the uterus, and its being less able to contract upon the contained bodies. It is quite obvious that it cannot expend all its force upon one, the other intervening and preventing this. Usually, then, the first child is expelled naturally, and it is when we apply our hand to the abdomen immediately after this that we become aware, and without doubt, of the presence of another child. We have seen a young practitioner mistake a large uterus contracting on the placenta, and some contained clots, for a second child. When we know that there is another infant, it is our duty to find out the presentation at once, because it might be a transverse one, in which case we would proceed to turn. If a head, or footling, or breech, we rupture the membranes at once, so as to expedite the labor. We need hardly point out that there is no use here in preserving the bag of waters, because it will be evident that the first child and its bag have done the work of dilatation already. We would only preserve it if it were a "cross birth," until we got the hand up for the purpose of version. The interval between the birth of the first and second twin varies a little. Ten to twenty minutes is a common period, but sometimes the second will come away at the heels of the other, just by a pain or two. A day or two, however, nay, even weeks, may elapse. The time, as a rule, depends on the pains; for the passages have been prepared by the previous child for the easy descent of the next. Where delay occurs, such as an hour or two, it is owing to the cessation of pains. Of course, if the second child were unusually bulky, this might cause delay. We said before that when a second child is discovered it is better not to tell the mother, but to announce the fact symbolically, or hieroglyphically, to the nurse only. If the woman should suspect a second child, tell her that it will come easily and rapidly away. This will cheer her up somewhat; she will be inspirited for the fresh effort; and when it arrives she will enjoy a doubly "sweet forgetfulness of pain and woe."

359. **What to do if the Second Child does not come away.**—If the uterus remains lethargic and quiescent after the birth of the first twin, and does not offer to resume its contractions, what is to be done?

Authors have given diverse answers to this question; indeed, the discrepancy marking the treatment of the placental stage obtains as much here. Going back more than a hundred years, to the time of Burton, we find him recommending immediate delivery of the second child by the feet, and without waiting for pains (Midwifery, p. 134). Denman advises delay for four hours, if there be no cause for delivery sooner. Dr. Burns said an hour. Our own method is this: So soon as the first child is born, we begin to make gentle pressure on the abdomen, as in the placental stage, at the same time rupturing the membranes. If, in the course of from ten to twenty minutes, no uterine action is set up, then we administer Liquor Ergotæ; continuing at intervals the abdominal kneading, or rather, gentle pressure. If these means fail, we bring down the feet without further delay, trusting to uterine contraction following delivery; or, failing that, to the contraction following the distension of an elastic organ like the uterus, as adequate to prevent undue bleeding. Collins says that the second child is likely to be still-born if left longer than two or three hours unassisted.

Of course we should proceed to the delivery of the remaining twin if there were a transverse presentation, or if the labor were complicated by convulsions, hemorrhage, etc. As remarked in a previous part of this work, when we deliver the second child in this way, uterine pains are usually set up by the process.

360. **Third or Placental Stage in a Twin or Plural Case.**—Usually in twin-pregnancy each infant has its own membranes and placenta, but at times the two placentæ communicate by an inosculation of the vessels. Sometimes, but very rarely indeed, there is but one placenta for both, and Dr. Tyler Smith has supposed that in such cases the single ovule has contained two yolks, and two germinal vesicles, as is occasionally noticed in birds. If we had been in the habit, as some are, of placing only one ligature on the cord in single births, we would here have required to attach a second; for, as we have remarked, there is sometimes a vascular connection between the two placentæ, and bleeding would result were the placental end of the funis untied. We do not remove the placenta of the first child after it is born; we wait until the second comes into the world; after which both placentæ come away, or if need be, are helped away, according to the rules previously laid down. It is even more necessary here than in the case of single births to secure vigorous uterine contraction, because with the two placentæ there is a much more extensive bleeding surface exposed. To this end we should use gentle pressure over the uterus; and if there should be rather more flooding than ordinary, a dram of the Liquor Ergotæ may be given with benefit. Aware of this large uterine bleeding in twin cases, we should also avoid hauling away the afterbirth forcibly; rather by friction and other means promoting the contractions, and consequently its natural expulsion. The contractions are the tourniquet of Nature, and are effectual in stemming the bleeding.

361. **Locked Twins.**—It sometimes happens that a part of both children presents at the same time. It may be the head of one with a foot of the other, or both heads, as in fig. 57, where the one is a footling, and the other cranial. In this figure we have the occiput of the second child projecting below the chin of the first, and the head jammed between its neck and the back part of the pelvis. In other cases, the chin of one is placed beneath the chin of the other. The state of matters represented in the cut is somewhat grave. You may make traction by seizing the

inferior extremities, but you cannot pull the fœtus down. If you pull hard enough, you may get No. 1 down, but then it would be minus the head. This would be premature decapitation, and, therefore, unjustifiable and reprehensible. We do not believe in tumbling on the floor with a headless fœtus in our grasp. What need is there for pulling with such force? None whatever. Whenever you find, in a footling case, that the head won't come down with a moderate amount of traction, you must desist, and adopt some method less hurtful to the mother. But first examine to see the cause of the fixture. Place the woman under chloroform, introduce the left hand, and begin exploration. If it is a contracted pelvis, reduce the head; if it is a case of "locked twins," operate in one or other of the ways we are about to notice. We have said that the head must be reduced if it will not come down with a fair amount of traction, and our reason for so advising is this: Your strong pulling, while injurious to the mother, is sure to destroy the life of the child, and may lead to decapitation. Better than these results is the diminution of the cranium—1st, because you save contusion of the soft parts; and, 2d, a child with a perforated head—the scalp being brought neatly over the opening—will not horrify the friends like the spectacle of an infant without its head.

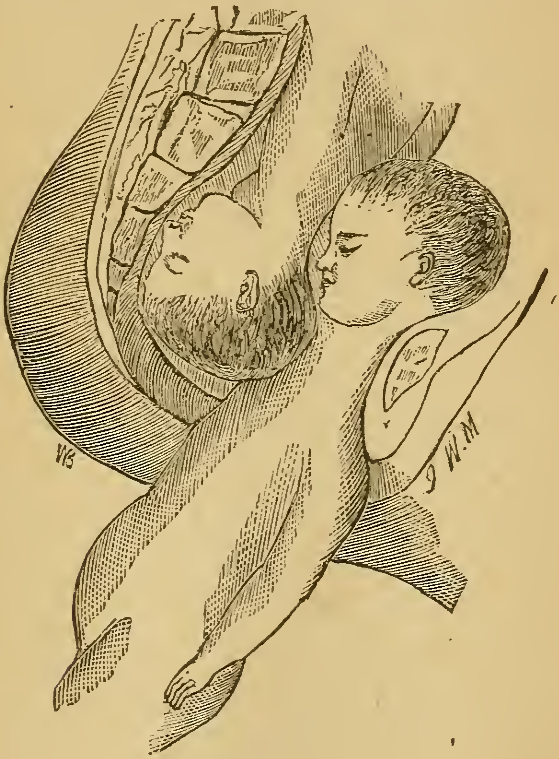

FIG. 57.

362. **Treatment.**—There are various plans that may be tried in a case of this kind—that is, where the heads have become locked in the manner

shown in the cut. You must, first of all, endeavor to unlock the heads. Place the woman deeply under chloroform, if there is much tonic spasm of the uterus. Elevate the pelvis and depress the shoulders of the patient. Then insert the left hand (its back being well greased), and endeavor to push back the head of the second child. While you are doing this, let an assistant seize hold of the body of the first child, and push it also back. Steady and by no means weak pressure upward must be made by the left hand on the head of the second; and if we succeed in setting it free above the brim, we must hold it there until the assistant reverses his pressure—until, in fact, by downward traction he brings the head of the first child into the pelvis. When we have managed this we are at the goal; no further difficulty is likely to be experienced. If we fail, what are we to try next? There is nothing but the sad work of a severance of one of the children's heads. The first child is selected for cutting, chiefly for this reason, that it is more exposed to danger, and more likely than the other to perish. Its neck has been pressed upon, but that is not a great matter; its funis, however, is also liable to compression, and that, of course, will rapidly kill it. We find out its condition by grasping the cord. How are we to operate? Make the assistant draw the child well forward, so as to bring the neck as near to you as possible; then, with scissors or a blunt-pointed knife, cut through the neck. You will find it, as a rule, easier of accomplishment in this way than with the decapitating hook. The trunk of the child comes home at once after this. As regards its head, you should push it up with your left hand, if necessary, and thus let the second child down. If the natural powers are insufficient to propel and deliver the latter, we may employ either the forceps or turning. The head of the second child, which is last to arrive, may be delivered by the cephalotribe. Sometimes the head of one child has come down into the pelvis, and has been jammed there by the head of the second presenting in the same way. In this case we must make an assistant push up one head, and deliver the other by means of the forceps.

363. **Alleged Sterility of the Female in Twin Births of Males and Females.**—It was asserted that females (human) born co-twin with males were characterized by infecundity; but the late Sir James Simpson investigated the subject, and found this to be erroneous. His conclusions were (Edin. Med. and Surg. Jour., No. 158): (1.) "That in the human subject females born co-twin with males are when married, as likely to have children as any other females belonging to the general community. (2.) That, when they are married and become mothers, they are, in regard to the number of their children, as productive as other females. (3.) That the same law of fecundity of the female in opposite-sexed twins seems to hold good among all other uniparous domestic animals, with the exception of the cow alone."

Dr. Matthews Duncan's Conclusions respecting Twin-Gestation.—Dr. Duncan, from investigations made on this subject, has deduced the following:

"(1.) The largest number of twins is produced by women of from twenty-five to twenty-nine years of age; and on each side of this climax of fertility in twins there is a gradually increasing falling off in their number, as age diminishes on the one side, and increases on the other. (2.) Twins are not regularly distributed among births generally; their production, therefore, is not subjected to the same laws as govern ordinary fertility. (3.) The mean age of twin-bearing mothers is greater than that of mothers generally. (4.) Twins increase in frequency as mothers become older. This forms a striking contrast to the fecundity of the mass of wives (not mothers), which diminishes as their age increases. It accords, however, with the law of intensity of fertility of fertile woman. (5.) Newly-married women are more likely to have twins the older they are. (6.) While the fecundity of the average individual increases with age till twenty-five is reached, and then gradually diminishes, there is some probability that the opposite is true, so far as regards twins alone; fertility in twins being greatest when fecundity is least, and *vice versâ*. (7.) The actual number of twins, born of a mass of women in different pregnancies, decreases as the number of the pregnancy increases. (8.) The number of twins, relatively to the number of children born in different pregnancies, increases with the number of the pregnancy. In other words, a woman is more likely to have twins in each succeeding pregnancy than in the former pregnancy. The first pregnancy forms an exception to this rule. (9.) In an individual, twin-bearing is of course a sign of high fertility at the time. It also, in a mass of women, shows a high amount of fertility, at least till the time of the birth of the twins. (10.) It is probable, though not proved, that twin-bearing women have larger families than women uniformly uniparous." (See work, Fecundity, Fertility, etc., before alluded to.)

Are Plural Births an Abnormality?—Dr. Arthur Mitchell has arrived at the following somewhat startling conclusions on this question:

"(1.) Among imbeciles and idiots, a much larger proportion is actually found to be twin-born than among the general community. (2.) Among the relatives of imbeciles and idiots twinning is also found to be very frequent. (3.) In families where twinning is frequent, bodily defects likewise occur with frequency. (4.) The whole history of twin-births is exceptional, indicates imperfect development and feeble organization in the product, and leads us to regard twinning in the human species as a departure from the physiological rule, and, therefore, injurious to all concerned. (5.) When we pass from twins to triplets and quadruplets, everything we know regarding these latter gives support to the general conclusions in question." (See *Med. Times and Gazette*, Nov. 15, 1862.)

364. **Monsters.**—We have not space to enter largely into the subject of monstrosity, but must be content with a very brief reference to it. It is usual to divide monsters, as Buffon did, into four varieties: (1.) Those with a deficiency of parts. (2.) Those with a redundancy. (3.) Those with mis-shapen parts. (4.) Those with misplaced parts.

(1.) *Deficiency of Parts.*—This variety is the most common, and includes such cases as hare-lip, split palate, and spina bifida. The parietes of the abdomen, above the pubis, are sometimes deficient, exposing the bladder. The bladder itself, too, is found defective, its mucous membrane being continuous at its circumference with the skin, and forming a red and very sensitive tumor. The pubic bones are separated by a fissure, and the recti muscles are split. The muscles and skin around the navel are frequently defective. Then we have legless and armless children, etc. In regard to these intra-uterine amputations, it is singular that the deficiency is usually on the left side. The most common variety is that of the amputation of the left arm, perhaps a little below the elbow, with one or two rudimentary fingers on the stump. Such cases are by no means rare. Sir James Simpson thought that the fact of the embryo usually lying on the left side might account for the defect being commonly on that side.

Anencephalous or Hemicephalic Children.—In these, which are pretty frequently met with, there is a "total want of the bones at the side and upper part of the cranium, as well as of the brain and the membranes covering it. The *basis cranii* is mis-shaped, and covered by a membrane continuous with the integuments. There is no forehead, and the skull runs backward from the superciliary ridge. Sometimes, under the membrane at the base of the skull, there is a quantity of soft pulpy matter, but oftener the medulla commences abruptly." These children are fully developed otherwise—indeed, bulkier than the average—showing, as has been pointed out by different authors, that the brain is not indispensable to intra-uterine growth. We have seen a number of these cases, and they are certainly not rare. Rudolphi of Berlin pointed out that this form of deficiency—the anencephaloid monster—was the result of intra-uterine hydrocephalus. This latter occurs frequently, like anecephalous cases, in the same woman.

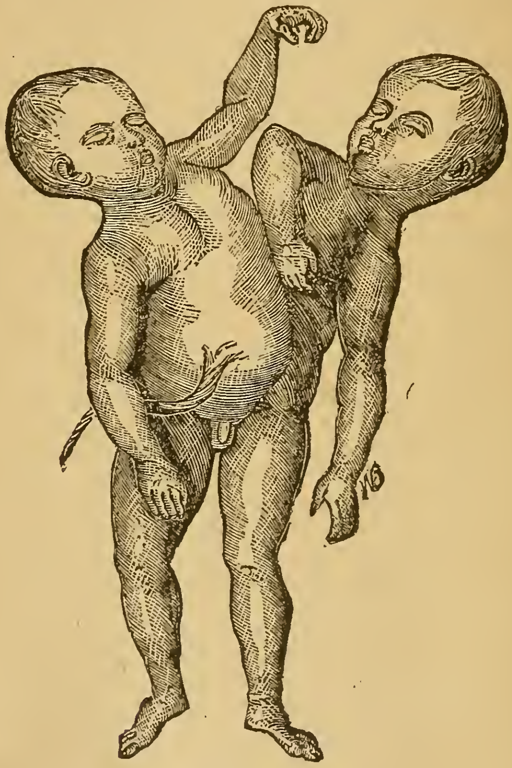

FIG. 58.

365. (2.) *Redundancy of Parts.*—Under this variety we have supernumerary toes and fingers, bi-headed children, infants joined together, like the Siamese twins, and others. There are some children born, too, with the parts of other fœtuses attached to them.

(3.) *Children with Mis-shapen Parts.*—In this variety are embraced cases of club-foot, imperforate rectum, urethra, œsophagus, etc.

(4.) *Cases of Misplacement.*—This is the rarest variety. The older authors retailed curious stories of arms growing from the sacrum, and legs sprouting from the sternum, but they drew not a little on the fancy. The viscera have frequently been misplaced, sometimes abdominal organs being in the thorax, and thoracic parts below the diaphragm. The heart has been found on the right side.

Monstrosities of all kinds seem to be hereditary; and it is a curious fact that in the case of twins, if one has a deficiency, whether of redundancy or the opposite, the other is pretty sure to have the same. Twins have been born, both having spina bifida, others with supernumerary toes or fingers each, or an enlarged clitoris, etc., etc. Women bring forth monsters successively.

366. **Causes of Monstrosity.**—In cases such as the Siamese twins it is supposed that union takes place after the fœtuses have grown a little. The membranes may have been imperfect, and the bodies of the children have then come into close contact, and united by their cuticular surfaces. There is a potent formative power in the vascular system of the fœtus, and vessels may soon shoot from one child to another.

In regard to the other monsters—those where there is excess or deficiency—it is speculated that the ovule is imperfect before fecundation, or that there is a disproportionate admixture of prolific particles during impregnation. Again, it is supposed that the departure from a normal state takes place subsequent to conception, owing to an irregular vascular distribution or excessive vascular excitement at one part, and diminished excitement at another. Thus the vessels of one part, being more plentiful, or more active, give rise to an excess of growth, while those of another, being fewer and less vigorous, occasion a deficiency of parts.

Richerand contributed a most valuable fact in connection with monstrosities, and which throws a deal of light on the subject. He placed the impregnated ova of a tench in a confined vessel, where there was no room for the numerous progeny formed to disport themselves. but where, on the contrary, they rubbed shoulders (so to speak). The consequence was that they adhered to each other—the compound being monsters. (See Elem. of Physiol. Trans., 1815, p. 462.)

In the vegetable kingdom it is observed that two fruits coalesce in a similar manner.

Delivery of Monsters.—The management of these cases will depend on the nature of the monstrosity. In many instances, no interference is necessary; in others, to which we shall refer presently, some part or parts of the monster may have to be lessened. In hydrocephalus we have to perforate the head often; at other times, when not unusually enlarged, it becomes moulded by the pains and the passages, and passes out unreduced. In some cases the abdominal viscera have been abnormally developed, and evisceration has had to be performed before delivery could be accomplished. Enlargements of the kidney, the liver, and the spleen, as also ascites have necessitated this.

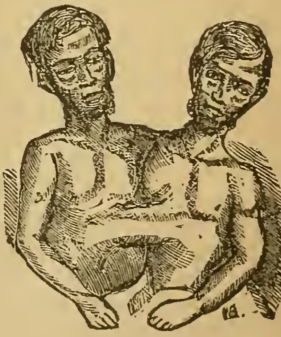
FIG. 59.

367. *Double Monstrosity.*—It is the double monstrosities that give most trouble, and are most difficult to deliver. Take a case where

two bodies are joined together at the side of the sternum or abdomen. The best presentation in such cases is pelvic, or by the feet. If the heads present, and after finding out that it is a double monster we have to deal with (by its not coming down, and by us exploring in conseqence) we must proceed to turn. After getting this effected, we make traction on the lower extremities of only one child. In this way the head of the one we are pulling enters the brim before that of the other, and the prominences of one fœtus dovetail into the depressions of the other. In some cases, when these double monsters have presented cranially, one head has come in advance of the other, the second head dipping into the hollow between the shoulder and the head of the other. The forceps is then applied to the head that has entered the pelvis; but there may be much difficulty in getting it down. Its delivery in this way is by doubling up. In such a case a head will likely require to be reduced, or the neck cut through with scissors.

Dicephalous Monsters.—In these cases, if the feet present, we must make traction by seizing the lower extremities, and then endeavor to get one head to enter the brim before the other. If unsuccessful, we must sever one of the heads, and, after delivering the body, extract the second head by means of the cephalotribe.

Acephalous Cases.—These are often tedious and protracted, owing to the fact that the children are usually huge. They often necessitate the use of the forceps. We have known the soft tumor at the back of the neck mistaken for the scrotum, and the accoucheur conclude that he was dealing with a breech case. There is a tendency to hemorrhage after delivery in such cases, and we recommend ergot to be given as soon as the child is born.

368. **Preventive Treatment of Monstrosity.**—This may appear to be a curious subject to touch on, but we believe it to be a deeply interesting one, and that it has been neglected in many quarters. We cannot certainly prevent a heart from occasionally deviating from its normal locality; or abdominal viscera from invading the thorax; or fœtuses embracing each other in that intimate way seen in the case of the Siamese and other twins; or the clitoris in some cases from enlarging hugely; or the debris of one embryo from dangling from the body of a normally-developed one. No; but we think some beneficial work may be done in those instances where we have arrested development—deficiency of parts, such as in spina bifida, acephaloid monsters, gaping umbilicus, fissured pubis, and incomplete bladder. Take the acephaloid cases first. Well, Rudolphi demonstrated that these were due to embryonic or intra-uterine hydrocephalus. The normal development is arrested by an excessive secretion of fluid within the cranium, How is this redundancy occasioned? Lugol says it is the offspring of scrofula. If this be correct, and we believe it to be so, why, then treat the strumous taint in the mother in the most efficient manner, and with all available means. Give her plenty of fresh air, iron, and cod-liver oil. At the same time lay an embargo on her in regard to coition. She is quick to conceive, but let her avoid the means until her system has had time to alter and to become stronger; then may her offspring be also more vigorous and healthy. See to the father's condition likewise. If he too is a strumous subject, subject him to a course of anti-scrofulous treatment. Is he syphilitic? If so, combat that malady by the proper remedies.

369. In those cases where the origin of the disease is ovular—where the little ovule is imperfect or degenerate—this may either be due to

weakness of the ovaries, or to a want of constitutional strength in the woman. But in all likelihood there is again a strumous explanation, requiring the same alterative and tonic treatment. But, in addition to this, we should be inclined to recommend, in all cases where there was a deficiency of parts, vigorous and persistent topical treatment, such as friction over the ovaries, shower-bath, galvanism, and inunction with a stimulating ointment. Of course, we cannot overlook the fact of the hereditary nature of monstrosity; but this need not paralyze our efforts in the way of treatment, for hereditary morbid states are amenable to amelioration, and may in a generation or two be outrooted. A man born with a diseased liver, or a woman born with a degenerate ovary, may never live to see these organs restored to perfect health; but just as we see the martyr to gout spared many pangs by regimen and other curative means, so these disordered organs may be benefited not a little, if not entirely cured.

In cases of deficiency of bone, such as spina bifida and ancephaloid monstrosity, it has occurred to some to treat the mother during pregnancy with the salts which go to constitute bone, such as the phosphates of lime, soda, calcium, etc. In so far as these go to combat the scrofulous condition, they will, no doubt, do good; but it is an error to think that these salts will achieve the object of preventing deficiency by giving them only during gestation. If they were appropriated directly by the osseous system, we would expect speedy benefit; but we have no reason to believe that this is the case. They should be given to the female, then, for a long period, and independent of that of gestation; in short, they form part of the treatment, not of spina bifida, but of the strumous state, which is the cause of it.

CHAPTER XXXVI.

PARTURITION.—CLASS III.—COMPLEX LABOR.—ORDER I.—PROLAPSE OF THE FUNIS, UMBILICUS, OR CORD.

370. The cord sometimes comes down by the side of the head, or breech, especially when it is long. This descent of the funis would not impede labor, but yet it demands operative interference in order to save the child, or, at least, to avert from it a considerable danger. This risk, it will be obvious, arises from the compression to which the cord would be subjected between the fœtus and the pelvic wall during the child's descent.

Causes.—Length of cord, contracted brim, relaxed cervix, etc., in multipara. Implantation of placenta low down in uterus. (See the younger Naegelé's essay.)

Statistics.—It occurs about once in 200 cases, and out of a group of 722 cases collected by Churchill, it killed fully more than one half of the children. In ordinary practice, however, the mortality need not be anything like this; indeed, if we are called in time, we rarely fail to preserve the infant. The delay is what leads to danger, and, doubtless, many children have perished before the doctor's arrival.

Diagnosis.—We have found that funis presentation is easily made out even by the comparatively inexperienced student. He will be doubtful whether a particular presentation be hand or foot, knee or elbow, especially if the membranes are entire; but he rarely, if ever, mistakes the soft, rounded loop of cord, and then he feels its pulsation between his fingers.

Treatment.—Various methods have been suggested. Denman and others recommended turning; and where there is space, and liquor amnii, this is a desirable plan. You deliver pretty quickly in this way, and often save the child. Another plan is to grasp the cord gently, and carry it to the side of the pelvis. This is not satisfactory, because even there it may be pressed upon. Another method is to place it away up above the presenting part, and maintain it there until the latter comes well down, when it cannot then descend before it.

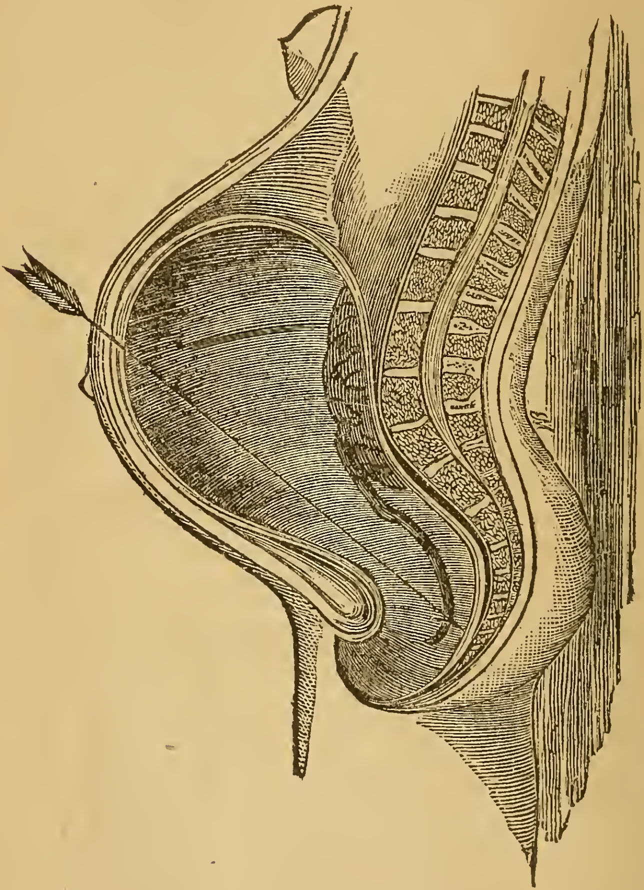

FIG. 60.

371. **Postural Method of Dr. T. G. Thomas.**—This gentleman has suggested a new plan, simple, yet ingenious, consisting of a change of the woman's posture. He considers that the causes of a persistence of a prolapsed cord (after it has come down) are: (1.) Its slipperiness. (2.)

The inclined plane presented by the uterus for its facile rolling out. (See fig. 60.) These being the causes, he recommends that we invert this plane, by changing the position of the woman. By placing her on her knees, with the head down upon the bed (the posture often resorted to in operations on the uterus and vagina), you invert the plane entirely, and thus the slippery cord glides and gravitates down in the direction of the woman's umbilicus—away, in fact, toward the fundus uteri—with the same facility that marked its descent in an opposite direction, when the female was lying on her back. (See fig. 61). When the funis is out of the way, we should, if necessary, stimulate the uterus to vigorous contraction, either by abdominal friction, or ergot, or both. When the head (or breech, as the case may be) has entered the pelvis, the patient may be permitted to resume the ordinary position.

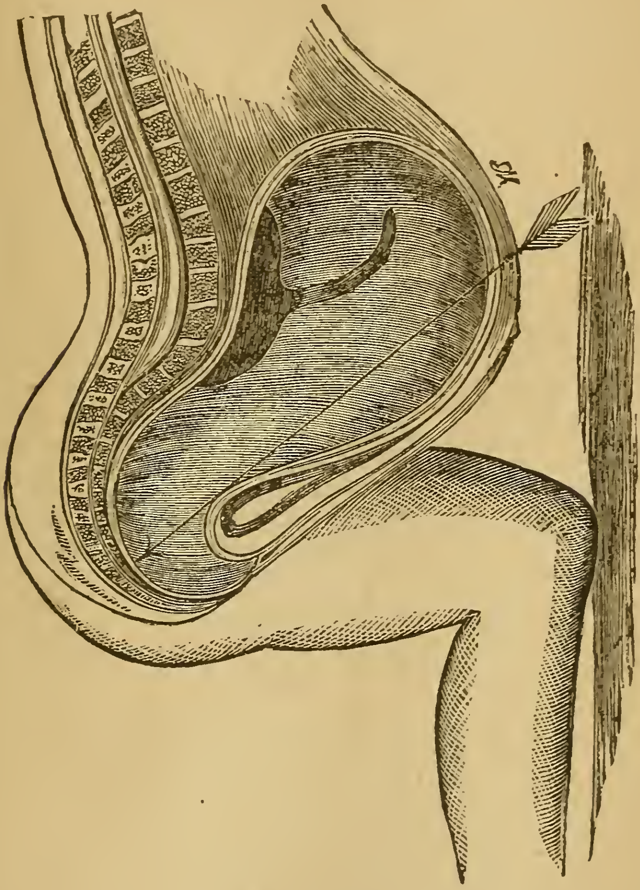

Fig. 61.

There can be no doubt of the great utility of Dr. Thomas's method of dealing with this complication, and we can bear our testimony to its utility. Professor A. Simpson published a case in the Edin. *Med. Jour.* April, 1864, wherein he found it to answer admirably; and, in the same paper, he adds other valuable collateral observations. It seems very singular that so simple a plan was not previously thought of; but this has often been the case with discoveries. Dr. Kiestra's suggestion was certainly made prior to Dr. Thomas's (see Canstatt's Jahresbericht, 1856, vol. iv., p. 514); but then he simply recommended the patient to be placed on her side, with the pelvis elevated.

The re-position of the funis, we ought to have stated, has hitherto been effected by the hand, or by devices, such as a strong gum-elastic catheter, with a ligature, or a stilette, with a ring at the extremity, made to open and close. These contrivances and others are likely to be in great part superseded by the method of Thomas.

CHAPTER XXXVII.

PARTURITION.—CLASS IV. COMPLEX LABOR.—ORDER II. RETAINED PLACENTA.

372. **Retention of the Placenta.**—The placenta may fail to come away from diverse causes. (1.) From uterine inertia. (2.) From irregular or hour-glass contraction. (3.) From spasms of the os. (4.) From morbid adhesion.

(1.) **Uterine Inertia.**—Here, if we could not excite the womb to contraction by external manipulation, or the application of a cold cloth over the belly, or the administration of ergot, we might introduce a finger or two, or the hand, cautiously into the uterus. We have seen this prove effectual. If the inertia persisted, and bleeding occurred, we would require to grasp the placenta and bring it away. Then the other measures might compel contraction. If not, there would, anyhow, be less risk of flooding, owing to the recoil of the elastic uterus. In some cases the womb remains flabby, and even relaxes, after contracting to a great extent. In such instances we ought to grasp it firmly in the hand, and force it, so to speak, into smaller bulk; at the same time, more ergot should be given.

(2.) **Irregular or Hour-glass Contraction.**—This extreme contraction of only a part of the womb, leading to its division into two chambers, communicating by a narrow canal (the constricted part), and resembling an hour-glass, is denied by some writers; but we are sure of its existence. Our belief is based on personal experience; we have encountered the abnormality. On many occasions now, having had to introduce our hand for the purpose of extracting the after-birth, we have been astonished to find, on entering, that said placenta was not to be found. Going a little higher, however, we have found a second os, as it were; and above that the article we were searching for. In these cases the constriction appeared to be about the junction of the neck and body of the uterus; and we are of opinion that the spasm is at the internal os usually, although analogy, and not a sufficiency of examples, leads us to that conclusion. In some cases we find the spasm intenser at the external os than anywhere else; may it not also be extreme at the internal one? In both, also, ergot had been administered in a pretty large dose; but whether the oxytoxic occasioned the irregularity or not, we shall not venture to say. This is alleged to be one of the causes; others are protracted labor, and an "irritable constitution."

Treatment.—Uterine spasm, irregular or partial contraction, is now successfully combated by chloroform. A full dose should be given; and often, while the female is under its potent sway, the spasm relaxes, and the placenta comes away. A little external manipulation may be employed, if need be.

373. (3.) **Spasm of the Os and Cervix—Encysted Placenta.**—The afterbirth is sometimes also encysted from extreme contraction low down, and the want of it in the body of the womb. We have seen the os and part of the cervix become like a girdle of iron, nothing could pass until it was relaxed. The treatment, as before, should be by chloroform, amply administered.

Sometimes there is an undue contraction of the circular uterine fibres, making the uterus into a kind of cylinder. This grasps the placenta, and retains it. The treatment is the same as in the previous cases. In addition to the anæsthesia, we may here, as in hour-glass contraction, pass up the hand in a conical form, steadily and firmly, and thus exhaust, as it were, the organ, unless expulsion follows the administration of the chloroform.

(4.) **Morbid Adhesion of the Placenta.**—This is due to the lymph thrown out in placentitis, or to cancerous and calcareous deposit. It is not a common complication, although juniors, on entering into practice, are often fancying that they have got a case. There is a good deal of danger in connection with this abnormality; first from flooding, and then from the risks of separation, and the consequences of it. If the adhesion be completed, the mouths of the utero-placental vessels are closed, but in partial cases this is not so, and the hemorrhage may be profuse and alarming.

Diagnosis of Morbid Adhesion.—There are no reliable indications until after finding that the placenta does not come away. Even during strong pains we begin the work of extraction. The history of the case may help a little. If the woman has had a fixed pain in a part of the uterus during pregnancy, this may augur placental inflammation. Another suspicious circumstance is, that where there is adhesion the uterus will remain larger—will present a broader surface to the hand on applying it over it.

374. **Treatment.**—Introduce the hand carefully into the uterus, and separate all the non-adherent portion from the adherent. No force should be employed to tear this latter away, but it should be left to break down and be discharged with the lochia. Constitutional evils may arise from the absorption of the decomposing remains of the placenta; but this cannot be helped. There would, most probably, be more evil inflicted by a forcible removal of the adherent part. Of two evils elect the smaller one. If the discharge in a case of this kind should happen to be very offensive, the fetor may be corrected by tepid injections, consisting of permang. potass., gr. ij. to the oz.; or carbolic acid, gtt. iij. to the same amount of water. Tepid water should also be thrown up the vagina three or four times daily.

Absorption of the Placenta.—Distinguished authors, such as Naegelé, Velpeau, and Rigby, believed in the actual absorption of the placenta by the uterus where it had been retained. Examples have been recorded; but, notwithstanding the wondrous devices and resources of Nature, we plead guilty to some skepticism on the subject. The absorbent or other vessels of the uterus could not take up this mass until disintegration had taken place, and that putrefying material could thus be safely absorbed seems to clash with all experience. Another and more probable theory is, that the part retained becomes organized and blended with the uterus itself.

CHAPTER XXXVIII.

PARTURITION.—CLASS V. COMPLEX LABOR.—ORDER I. FLOODING—HEMORRHAGE.

375. Flooding during gestation is rather a grave complication, and unless properly grappled with, may lead to serious consequences. We have alluded already to that hemorrhage which happens during the earlier months as the result of abortion; now we shall notice that occurring at a more advanced period of pregnancy, and after the birth of the child.

(1.) **Accidental Hemorrhage.**—This is the flooding which arises from the accidental and limited separation of the placenta, this organ being placed in its usual site. The vessels passing between the uterus and placenta are lacerated, blood is effused, and gradually forces its way to and beyond the edge of the placenta, thus separating it. In some cases the blood does not escape, but coagulates on the uterine surface of the placenta.

Statistics.—Out of 257 cases of this variety, 34 were fatal to the mother, or one in seven.

Causes.—This kind of flooding is distinguished from the next or unavoidable by the placenta not being within the cervical zone. The partial separation is due to some accident, and not to the expansion of the cervix, as in placenta prævia. The history is generally that of shock, violent exertion, straining, coughing, jumping, falling, etc. Plethora, mental emotion, irregular or spasmodic contraction of the uterus, are also named as causes.

376. **Symptoms.**—There may be hemorrhage appearing externally, or there may not, for the placenta may remain attached all round, not yielding to the pressure of the effused blood. Some cases prove fatal without any external flooding. When there is this latter, it may come in a small stream, or in gushes, ceasing when the uterine pain begins. There may even be such a flow of blood as to compomise the woman's safety. There is usually a dull or aching pain in the abdomen and back, feeling of distension and weight in a part of the belly, which swells and becomes firmer and tenser. Rigors come on, and faintness, with debility. The pulse grows feeble and fluttering, a cold sweat breaks out, the countenance becomes sunken, and a dark circle gathers around the eyes. Dimness of vision, sighing, ringing in the ears, restlessness, vomiting, hurried breathing, sense of suffocation, convulsions, have also occurred, and been the prelude of death. Some of the symptoms, and their extent and severity, depend on the amount of blood lost; but yet the separation of a very small portion of afterbirth has sufficed to kill.

Labor-pains may, or may not, come on when the separation and flooding have occurred When they do, the bleeding is arrested, but begins again during their cessation.

The child is likely to perish if the bleeding be profuse.

Diagnosis.—This form of hemorrhage may be distinguished from that in placenta prævia by its arrestment during the pains. In placental presentation the pains bring on the discharge, while here they stop it. Another point is that in accidental flooding, on introducing the finger into the os, we detect the membranes; whereas, in unavoidable hemorrhage, it is the placenta we touch. Further, we may be able to make out an antecedent cause, such as an accident of some kind. Lastly, in the form of bleeding under consideration, there will likely be the tenseness over the part of the abdomen corresponding to the site of the placenta, with aching pain, etc.

377. **Treatment.**—The treatment of accidental hemorrhage, if happening during labor, or if inaugurating or initiating labor, must be set about without a moment's delay. If the membranes are unbroken, we proceed at once to rupture them, in order that the uterus may contract upon the fœtus and placenta, and thus help to arrest the flow of blood. If the uterus does not act vigorously after the liquor amnii is thus artificially discharged, we must give ergot, and use abdominal friction, grasping the uterus as firmly as we can, and compelling it, as it were, to contract. Some brandy should be given if the woman be faint, and even whether she is faint or not, if the pulse have got somewhat feeble and quick. This will not aggravate the flooding, but, on the contrary, enable the uterus to contract more firmly. If labor does not go on speedily, we must trust no longer to the natural powers, aided by oxytoxics, but get the uterus emptied as fast as we can. If the forceps can be applied, they are to be used; if not, podalic version must be performed. Of course. by rupturing the membranes we have rendered turning more difficult; and on this ground some authors, such as Hamilton and Burns (men of vast and varied experience), have objected to it; but the treatment is not on that account to be condemned, for it very frequently proves effectual. We can never say beforehand that rupturing the membranes won't succeed; and, seeing that it is often of striking utility, we do not let exceptional failures prevent us from carrying out the plan, even supposing the doing of it renders other measures more difficult. If we did so, we might also avoid trying version in contracted brim, because embryotomy has sometimes to be performed after it, or embryotomy in extreme distortion, because the Cæsarian section has occasionally had to follow. If we were prescient, we might hit the right thing at once. In performing version in a case of this kind, we would require to keep up the woman's strength with stimulants, to move her about, or fatigue her as little as possible, and to operate with all possible dexterity. For if she has lost much blood, and is reduced to great feebleness. the operation will be a considerable shock to her. Still, her only chance is in the evacuation of the uterus in such circumstances; and where the natural powers are totally inadequate, we must adopt the speediest plan. If we do not deliver, she is likely to perish; if we do, she can do no more than succumb, and will likely do less.

378. Dr. Robert Lee has sometimes performed craniotomy in these cases, where the woman was greatly exhausted, "fearing," as he says, "that she might die during the operation of turning." The doctor had a good many fatal cases; but still we shall not presume to say that perforation and the crotchet were not preferable to version in some of his

cases. Of course, if the operation were a tardy matter, as in distorted pelvis, that would be a very grave proceeding in the presence of great exhaustion; but only a few minutes were occupied in perforating and delivering by the crotchet. We should always try the forceps before perforating, however, if we find version impossible. Other modes of treatment have been recommended in accidental hemorrhage, and especially if the woman have not reached the full term of gestation, and the bleeding is moderate. Temporizing means have been suggested, such as rest in bed on a hard and cool mattress, with a low temperature in the room, iced drinks, enemeta of cold water, and the tampon; astringents also, such as gallic acid, dilute sulphuric acid, solution of pernitrate of iron, cannabis indica, and opium. In reference to this temporizing plan, we have our doubts. Some may thus be carried to the full time; for we have seen placentæ showing clots, and other evidences of a partial separation of the afterbirth, and which separation did not excite labor; but a vigilant watch would have to be kept in case of dangerous bleeding.

379. As regards the tampon or plug (cotton wool, or strips of lint, etc.), it will rarely play a very useful part here. Stuffiing the vagina may prevent the blood flowing externally, but it cannot avert internal hemorrhage; for, as pointed out by Hunter, Denman, Merriman, and Ramsbotham, the uterus can contain a good deal more than the fœtal body and its appendages toward the end of gestation. It would be a very lamentable plight to find oneself in, if, after we had plugged and thought the woman secure (seeing no external sanguineous flow), she was seized with a mortal syncope. We would only sanction the tampon, then, after discharging the liquor amnii, and where there might be most unconquerable rigidity of the os. The membranes being ruptured, there would be less chance of an internal and concealed flow; phlebotomizing unseen the hapless female, until she had too little left to sustain the cardinal vital acts. We must add a word about opium. We find it is common in not a few text-books to recommend it as one of the anti-hemorrhagic remedies in uterine bleeding. The grounds for this we cannot understand. It is true, opium has a twofold action, according to the dose given and the period that elapses after it is administered; it stimulates and depresses. But if we want a stimulant, we will select brandy, or good whisky, in preference; and as regards its other function, when in flooding do we wish to depress? Professor Murphy, a very able authority too, says that as exhaustion increases we are to increase the dose of opium largely (Midwifery, 2d ed., p. 443). We should say that this was the culminating cause for its rejection. The soothing power of the drug might be useful where there was much nervous irritability, but we should take great care to be very sparing in its employment. Why, above all things we desire vigorous uterine contraction in accidental flooding; but that is not to be achieved by means of opium. On the contrary, by means of this drug we sap uterine energy. Its action is antagonistic to ergot here, and to place it side by side, and on the same platform with this oxytoxic, is as absurd as it would be to class strychnia and opium together in the treatment, say, of paralysis of the gut or bladder. We think the doctor might be slain by a pebble from his own sling. He has written ably on the relation between muscular power and nervous contraction, and shown how indispensable the former is to the latter. This we believe to be sound and true; but we have yet to learn that this nervous power can be sustained by opium.

In profuse hemorrhage, threatening death, the propriety of performing transfusion ought to be considered.

CHAPTER XXXIX.

PLACENTA PRÆVIA, PLACENTAL PRESENTATION, OR UNAVOIDABLE HEMORRHAGE.

380. This variety of flooding is occasioned by the separation of a portion of the placenta from its attachment to the uterus, the separation being the result of the expansion of the cervix and os toward the end of pregnancy. Normally, the placenta is attached to the cavity of the fundus (usually its right side), but here, by a most unlucky mischance, it has become affixed within the cervical zone. It is sometimes placed over the whole of the os and cervix, in which case it is termed placenta centralis (fig. 62); at other times it is attached over a part of its margin, and a portion of the cervix, when it is called placenta lateralis. In either case, but particularly in central implantation, the expansion of the cervix during the latter period of gestation, and the dilatation of the os at its close, cannot take place without separation of a part of the afterbirth, and consequent hemorrhage. The bleeding has thus been termed unavoidable.

There have been various explanations given of this erratic insertion of the placenta. The older authors believed that it was originally at the fundus, but that somehow it had got loosened, and then gravitated toward the os. This view may have been plausible enough, considering the light these worthies possessed, but it can meet with little support at the present day. Still we have not yet got out of debatable land; we only conjecture yet as to the cause of this misplacement, and may be long in getting further. Dr. Barnes, in his able Lettsomian Lectures, supposed that the chorion in the earlier months of gestation, "was in close vascular relation with the decidua vera in its entire superficies," and that the locality where the chorion and decidua became blended and developed into the placenta was a matter of accident. Dr. Tyler Smith deals a deadly blow to this theory. He points out, that though in the middle and latter months the chorionic envelope is everywhere in contact with the decidua vera, it is not so up to the 2d month, at which time, nay, before it, the site of the placenta has been fixed. This is a powerful argument against Dr. Barnes' view, and one which hardly requires the feeble support of the following plea of our own, viz., that if accidental circumstances determined the placental site, we should have a greater variety in this latter, and should find it less uniformly attached to the fundus uteri.

381. Dr. Tyler Smith's own theory is more plausible. He thinks that the abnormality is caused either by the impregnation of the ovule, or the arrest of the impregnated ovule after it has descended through the oviduct and uterus, and arrived at the upper part of the cervical zone, this part being the last point at which the ovule retains its capability of impregnation, and attachment to uterine surface.

Legroux, observing that it happened most frequently in multiparæ, concluded that it arose from the larger extent of uterine cavity permitting the ovum to spread its attachments lower than usual.

Portal (Complete Midwife's Practice, 1685) was among the first to describe the complication, publishing some cases also in the same work. It is singular that so critical a complication, and one by which many parturient females have been destroyed, excited so little interest after the appearance of Portal's work, until after the lapse of a long period. One may take up numerous works without finding an allusion to it, a thing incomprehensible, unless on the ground that these authors had never either met with or heard about it—an improbable thing. Smellie, in his very practical work, alludes to it, and gives cases; but it was reserved for Dr. Rigby of Norwich to explain it thoroughly in an essay written only about a hundred years ago.

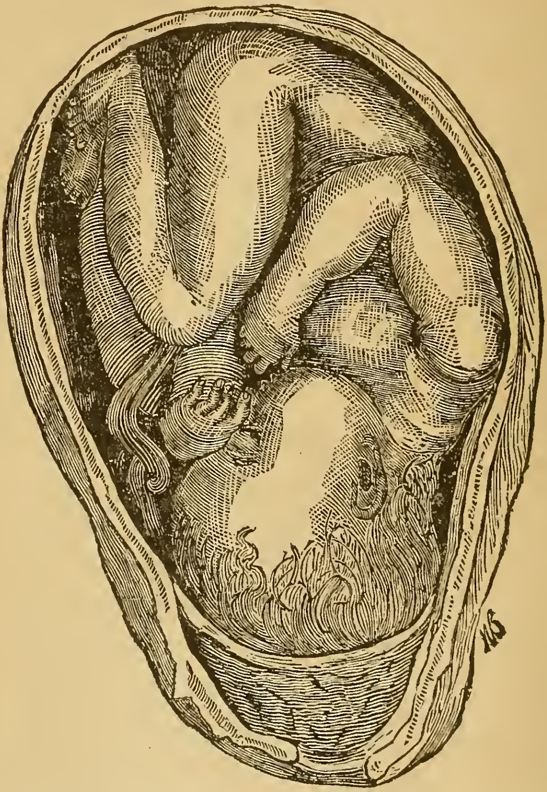

FIG. 62.—Placenta Prævia.

382. **Source of the Hemorrhage in Placenta Prævia.**—Few points in obstetrics have been more keenly canvassed and disputed than this one, and it is necessary to notice this, because it has a most important bearing on practice. The late Sir James Simpson adopted and advocated, with his usual force and zeal, the doctrine of his predecessor, Hamilton, that the flooding came chiefly from the placental cells; the supply of blood to these cells being maintained by vessels connected with the still attached portion of the placenta. That part of the uterus where the separated portion was attached was supposed to yield no

blood, the uterine veins having become closed. A good many experienced obstetric authorities deny this doctrine, among them Drs. Robert Lee, Tyler Smith, Davis, Ramsbotham, Dewees, etc. These authors hold that the source of the hemorrhage is the uterine veins. Dr. Radford of Manchester believed that it came chiefly from this source, and partly from the placenta. The arguments *pro* and *con* may be noticed. Sir James Simpson founded his belief in the placental source of the flooding on the fact that, in those cases where the placenta came away entirely before the child, the hemorrhage ceased, or was not of any consequence; while in those where only a small portion was detached, the hemorrhage was so great as often to occasion death. Dr. Hamilton has reported a case (Practical Observ., 2d ed., p. 314) where death occurred and yet the area of the separated portion was less than a square inch. Professor Simpson, we may state, collected a great many cases in support of his view, and tables of these will be found in his Obstetric Works, vol. i., p. 694. It will be as well for us to give Sir James's opinion in his own words. He says: "1st, The maternal portion of placenta is of

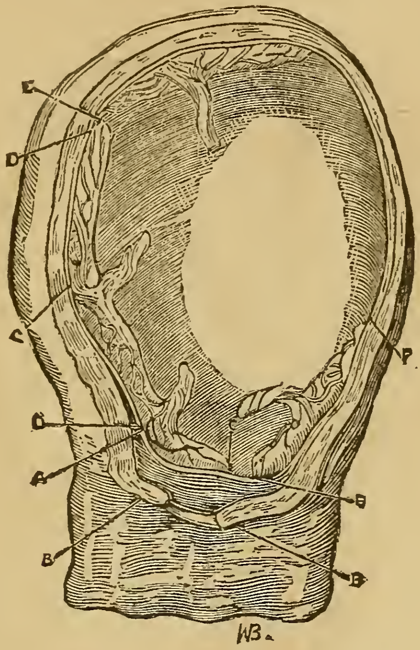

FIG. 63.

VARIETIES OF PLACENTAL INSERTION.

E. D. Fundal placenta.
D. D. Lateral placenta.
F. F. / C. B. } Latero-cervical placenta.
A. B. / B. F. } Seat of cervico-orificial, or central placenta.
A. / E. } Line of boundary between normal and prævial placental insertion, and consequently of spontaneous placental detachment during expansion of cervix.

a cavernous structure, consisting of a series of maternal vascular cells, or dilatations, or, more properly speaking, of one large maternal vascular bag, into which the blood of the mother is conveyed by the utero-placental veins. 2d, The vascular maternal cells, or immensely dilated capillaries, which contain the blood of the mother in the placenta, communicate so freely with each other throughout all the different portions of the organ that the blood which has access into one part may in this way be rapidly diffused into the other portions of the placental mass. 3d, The deciduous, or uterine, surface of the placenta has no vital, muscular, or contractile power by which it can constrict the orifices of the vascular tubes which pass from the uterus into it, when these tubes are ruptured in consequence of a greater or less detachment of the organ from the interior of the uterus."

383. Then another rather striking thing is, that hemorrhage is sometimes so great, even when only a small portion of placenta is detached. It is true that the venous openings are large, and that there are no valves, yet that it should have been so profuse in such a case as that of Hamilton does excite our wonder a little.

Sir James Simpson adduced another reason for the excessive hemorrhage. He pointed out that when a small portion only of the edge of the placenta was detached, and yet profuse hemorrhage followed, it might be owing to an opening (due to the placental separation) into the circular sinus of Meckel, which is the largest vascular canal in the placenta.

From this theory it would follow that the smaller the size of the disjoined part of the placenta, the greater would be the hemorrhage, because the more that remained attached the greater would be the surface for receiving it from the uterus. While the placenta remained attached, with the exception of a small part, it might not unfitly be likened to a huge leech sucking in supplies from the uterine surface, and discharging it from the detached part by the os.

The arguments against this view are as follows: (1.) The uterine venous openings are large, and the veins being valveless, there is no impediment to the flow of blood from the right auricle to the mouths of these uterine veins. (2.) In post-partum hemorrhage, bleeding takes place to a great extent from this source, and after the placenta is detached, and even delivered. (3.) The blood lost in placenta prævia, and in post-partum hemorrhage, is of a venous character, and indicates a common source. (4.) In inversion of the uterus, after the entire evacuation of the uterus, the flooding is known to be exceedingly profuse. (5.) During the pains the bleeding is increased by the expansion of the uterine openings, arising from the dilation of the os and cervix, while in bleeding from the fundus the flow is arrested during the uterine contractions or pains. (6.) On examining the portion of placenta which had been separated, it has been found that the sinuses and cells contained coagulated blood. (7.) In some cases where the placenta has been detached naturally or operatively, the hemorrhage has, notwithstanding, continued, and where it has not, it has been arrested by the strong contractions of the uterus.

We may state that, from having dealt with many cases, as well as from other considerations, we have come to entertain the opinion of Dr. Radford, that the blood flows both from the uterus and placenta, though to a greater extent from the former than the latter. The blood we have seen has generally been of a venous character, though sometimes arterial, as noticed by Dr. W. F. M'Kenzie, and mixed.

Statistics.—Under the usual management, one in three of the mothers are lost, and nearly one half of the children. Where the placenta was either expelled or artificially detached and removed first, or prior to the delivery of the child, only 1 mother in every 13 died, according to the table of Sir James Simpson, and 69 per cent of the children were lost. This favorable result in these latter cases, as we shall see, led Sir James Simpson to recommend in some cases its artificial removal.

384. **Symptoms of Placenta Prævia.**—There is a discharge of blood from the uterus at a period ranging from the middle of the 7th month to the termination of pregnancy. Its amount varies, depending upon the period of gestation at which it appears, or, in other words, upon the greater or smaller amount of development of the cervix. The blood comes away painlessly, and may happen when the woman is in bed, and not exerting herself, much to her astonishment. The bleeding may cease soon, to be resumed again in a day or two, or week or two. Sometimes the first discharge has been so profuse as to kill. Occasionally the discharge induces labor pains at once, and this in our opinion is a good thing. If uterine contractions set in, the flooding is increased, and might go on to a fearful extent if labor were delayed. On examination, if the os is open, we may touch the placenta lying over it, or to the side, just as it is a central or lateral case. Then the uterine soufflet is heard most distinctly low down in one or other iliac region.

Diagnosis.—This variety may be distinguished from the accidental—(1.) By its increase during a pain. In accidental, it will be recollected, the bleeding is arrested during the pains. (2.) By its coming on without any apparent cause, such as over-exertion, coughing, stumbling, falling, etc. (3.) The discovery, by the touch, of the afterbirth within the cervical zone instead of the membranes, with which the placenta cannot be confounded. A clot may mislead a little, but it is more readily broken down.

385. **Treatment.**—The principal methods recommended are:

1. Version.
2. Puncturing the membranes.
3. Entire separation and extraction of the placenta.
4. Total cervical detachment of the placenta, or plan of Barnes.
5. Partial cervical detachment, or plan of Cohen.
6. The employment of the tampon or plug.
7. Temporizing by means of rest, astringents, etc.
8. Induction of labor on the appearance of the first flooding.

(1.) **Version.**—We have said before, in a paper published by us (Edin. Med. Jour., Nov., 1868), that turning (podalic version) is the best method where there is a fair prospect of effecting it, where the hemorrhage has not reduced the woman to death's door, and where the placenta was not hanging loose within the os. Its advantages are great. You expedite delivery; you arrest the hemorrhage; you give a chance to the child. In turning, that is, after we have seized one or both legs, and made them descend, we find that their pressure arrests the flow. The leg of the fœtus, in fact, is the best of all tampons, because it is something in addition to mere plugging; by it we are enabled to deliver at pleasure. All authors who have written on this subject agree in viewing the complication as a trying one for the accoucheur. We have been struck with Smellie's statement in reporting a case he had met with. He says, "I kept my countenance as well as I could" (Midwifery, vol. ii., p. 313), meaning, kind soul, that though the nature of the case impelled him to seriousness of mind, he was determined that this should not be mirrored in his visage, for fear he should depress the poor woman to her damage. Well, however grave we may be when we meet with this hemorrhage, the situation is much improved when we are enabled to seize a foot of the child, and to turn. But now let us notice how we are to get up to a foot. It is in the usual way; but then, here the door is closed, in whole or in part, by the placenta, and may even be shut, as it were, by a rigid, because undeveloped, os uteri. As regards the os, we are in the habit of practicing careful manual dilatation. Some object to it as likely to injure the uterus, but we have never found the clean hand, carefully employed, do the slightest harm. Work it gently with a semi-rotatory movement. There is another plan, that of Hicks, which we have noticed at length, which is well worthy of consideration. If you can turn by that method, you certainly have no chance of lacerating the uterus, at least with the hand. It is often, however, of difficult performance, and if there is profuse flooding, the speediest plan must be adopted.

386. Then as regards the placenta, which may be in our way after the dilatation of the os, if it is central, or entirely over it (which does not happen very often), we should pass the hand up at the side when it offers least resistance. If it is laterally placed, the hand can be passed up at the side opposite to that where the placenta is attached. If we find the placenta in any particular case so firmly attached that it cannot be easily separated, and if we discover no thin portion at the edge, shall we plunge our hand right through the centre of the afterbirth, and thus reach a limb? This is not a good plan; it is unsafe, and not very practicable at times. Mohrenheim, it is true, recommended it (Praxis Medico-Obstetrica Mosq., 1810, p. 176), and Smellie once practiced it; but it was from necessity, not choice. The danger lies in tearing the placental vessels, and increasing the flooding. Thus may the child be put in peril as well as the mother. Besides, the plan may fail. In pushing up your hand against it, it may resile and recede instead of giving way, there being little counter-force —nothing beyond that which it is able to offer as the result of its attachment to the cervix. You may merely extend it a bit, without tearing it through. The same thing often happens with the membranes, for we find them at times, though vastly thinner, resisting our attempts to perforate them with the finger, until the force of the water behind helps us to affect their rupture. A soft and friable placenta will be more easily penetrated. You might also, in some cases, push up and loosen the entire afterbirth, in which circumstances you would have to remove it before turning. Fortunately, it is very rare to meet with a case where the hand cannot be passed up by the side.

After we have got the evolution of the fœtus accomplished, and the legs brought down, there need be no great hurry in finishing the delivery provided the pressure of the child has arrested the hemorrhage. A little time may be given to enable the full dilatation of the os to take place, so as to add to the safety of the child.

387. (2.) **Puncturing the Membranes.**—This is an ancient plan, but it is not often that we can rely upon it in this complication. In our humble opinion it should never be resorted to when we have a fair prospect of performing version. One may evacuate the liquor amnii, and yet find the labor proceed slowly, and have to resort to version under more adverse circumstances. We have no doubt whatever that discharging the liquor amnii restrains the flooding to a certain extent, by diminishing the size and, consequently, the vascular supply, of the uterus, as also by favoring uterine contractions and the descent of the child, which may

stem the flow by compression; but, at the same time, we cannot look for a cessation of the bleeding, which is what we anxiously desire, unless the fœtus comes rapidly down thereafter. We must bear in mind, too, that though the uterus may be lessened after the puncturing of the membranes, and, consequently, the calibre of its vessels, these during the pains are rendered patulous, and profuse flooding may still take place. We have seen it in more than one case,—extensive flooding where there was no liquor amnii, flooding that would have soon proved fatal had art not stepped in. Some cases of partial placental presentation, however, do well enough under this plan, but is it not better to turn when you have the thing made so easy by the presence of liquor amnii? When the os won't admit the finger, it is usual to puncture with a probe, or trocar, or stilette.

388. (3.) **Plan of Entire Detachment and Extraction of the Placenta prior to Delivery of Child.**—This method, as previously stated, engendered a great deal of controversy, often heated and acrimonious; and yet it need not have done so, in our estimation, had the antagonists of it appreciated aright the grounds on which Sir James Simpson recommended it. It was supposed that Simpson intended to adopt it on all, or, at least, most occasions, in preference to version, and perhaps the gist of his earlier papers was such as to favor this conclusion: but from later writings it clearly appeared that Sir James did not go in for the total abrogation of turning in such cases, but only preferred previous removal of the placenta when version and other means were dangerous or impracticable. Had this been understood thoroughly at the outset, Sir James would have met with less opposition, and no little angry disputation would have been spared. The following are the conditions rendering this method the most preferable, according to Sir James:

(1.) When the flooding is so profuse as to impel us to interference, and is not restrainable by the milder anti-hemorrhagic means (such as puncturing the membranes, etc.),but at the same time version, or any other forcible means of delivery, is especially hazardous or impracticable, whether from rigidity of os, or distortion, or contraction of the pelvic passages.

(2.) When the child is dead, or premature and nonviable, and version were to subject the mother to great risk, either on account of the loss of blood she may have sustained, or the state of the os and pelvic passages.

Then he says: "In most primiparæ, in many cases in which placental presentations are (as often happens) connected with premature labor and imperfect development of the cervix and os; in labors coming on before the 7th month; when the uterus is too contracted to allow of turning, and when the mother is profoundly exhausted, and therefore unable to submit to the shock of forcible delivery," he would adopt the method of removing the placenta first—that is, making the 3d stage of labor precede the 2d.

389. Sir James Simpson, then, as we have said before, did not put forward this method as one meant to supersede turning, but as one, in his belief, of great value when turning could not be performed. We know that in his later years at least, for we have heard him say it more than once, he viewed version as the grand line of treatment in this complication, save in the exceptional circumstances to which we have referred.

Let us now notice shortly the reasons which induced Sir James to advocate and practice this plan. They were, it must confessed, of a very cogent nature. He laboriously collected a great number of cases of placenta prævia, and found that where the expulsion, naturally and spontaneously in some cases, in others artificially, preceded the delivery of the infant, a far greater number of mothers were saved than when the child came first away. In ordinary management, one mother perished in three; in the other—that is, where the afterbirth came away first—only one in thirteen was lost. These were facts calculated to make a powerful impression on any obstetrician, and Sir James could not fail to be immensely struck or to turn them to practical account. But it be may asked, If so many woman are thus saved when the placenta comes first away, why not constitute into a rule, and carry into practice, the removal of it previous to the infant's birth on every occasion? Ah, unfortunately, that is a different matter; for we have too good reason to believe that the artificial removal of the placenta would not give us the diminished mortality desired.

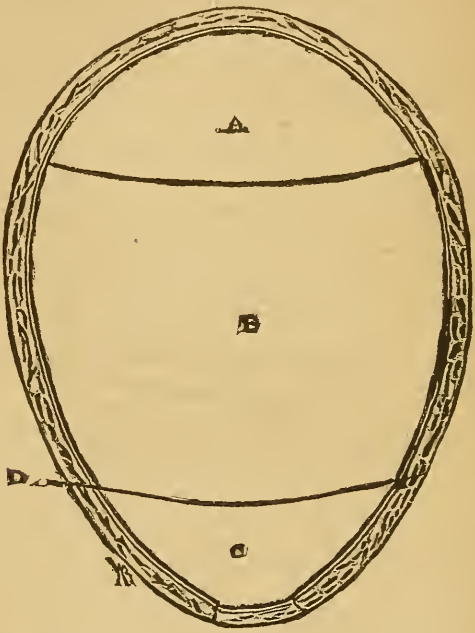

Fig. 64.—A. Fundal zone, normal site of placenta, and where it is not liable to separation before labor.
B. Meridional zone, site of lateral placenta. and where the latter is also not liable to previous separation. Dr. Barnes, however, believes that when the placenta is placed here, it helps to cause " obliquity of the uterus, oblique position of the child, lingering labor, and a tendency to retention of the placenta and post-partum hemorrhage."
C. Cervical zone—dangerous placental seat.
D. This line is the limit of spontaneous placental detachment.

390. In many of Sir James's cases Nature expelled the placenta—that is to say, the uterine contractions did it; but it might be vastly less favorable were we to remove it with the hand; for we might find, after doing so, that uterine pains refuse to begin, or were tardy, and that, therefore, the child did not descend and compress the bleeding vessels. In the

cases where the uterine contractions expelled the placenta first, they were usually sufficiently powerful to bring down the child pretty quickly, and thus prevent flooding.

If we could always calculate on the child coming into the world soon after the removal of the afterbirth, by the force of the uterine contractions, then we might adopt that method whenever version seemed to us beset with difficulty or danger.

We have no doubt whatever that the most favorable conditions we can have in placenta prævia are: (1.) The afterbirth expelled *first*, by the vigorous contractions of the uterus, and the child, in virtue of the same natural force, propelled speedily thereafter. (2.) Footling presentation, enabling us, as before said, to command the labor, and to use the child as a tampon.

How far ought we to go with Sir James?—We might follow his treatment in most of the conditions in which he recommends it; but only we should remember well that whenever we have a reasonable prospect of effecting version, that is the method giving us the best hopes as to maternal and fœtal safety. One notable drawback to the method that we must not omit to notice, is the risk to the child. When the interval between the extraction of the placenta and the birth of the child, extends even only to from five to ten minutes, there is a strong likelihood of its death occurring. In Dr. West's cases, 17 in number, 16 were lost.

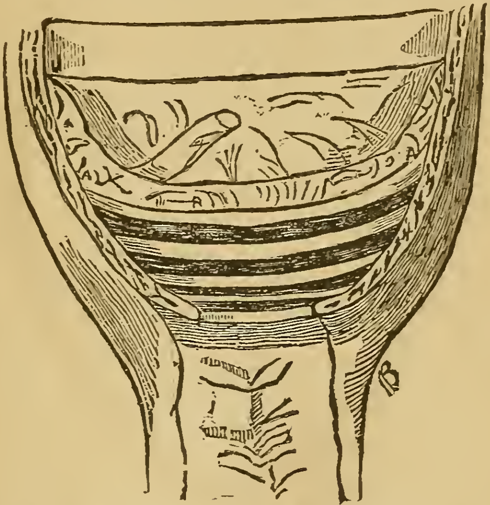

Fig. 65 shows progress of detachment of placenta. It is cast off in zones or rings if a case of central insertion, and in segments of rings if one of cervico-orificial placenta. At A A the dilatation of the os involves no further detachment of placenta.

We may state that this method was practised fifty years ago, by Mr. Kinder Wood of Manchester; and Dr. Charles Clay also adopted the plan, and met with much success.

391. **Total Cervical Detachment of Placenta, or Plan of Barnes.**—Dr. Barnes originated a novel method, that of partial separation of the placenta. (See his Lettsomian Lectures on Midwifery, for the year 1857.) There can be no doubt as to the ingenuity of his views, but there may be some at least as regards the practice based on these views. The doctor divides

the inner surface of the uterus into three zones. The upper is called the fundal zone (fig. 64, A), the lower the cervical (fig. 64, C); and between them, and larger than either, is the meridional zone (fig. 64, B). The placenta may be situated in any of those regions; but while it is safe in the upper or fundal zone (not liable to separation), and also in the middle or meridional zone, in the cervical it is not so, but is liable to separation when the os and cervix uteri expands. This cervical zone is therefore the region of dangerous placental implantation. Dr. Barnes is of opinion that when the placenta is placed over the os the uterine contractions cast it off in concentric rings (see fig. 65), from below upward, until the separation is carried high enough to permit of the passage of the fœtal head. The hemorrhage then ceases, although a sufficient amount of placenta may remain attached to allow of the maintenance of the child. A stage of labor has arrived when the recurrent contractions of the womb do not entail any further flooding. The old view was, that in cases of cervical attachment the flooding was bound to go on with every recurrrent contraction; but here the doctor points out that a point is reached when the hemorrhage ceases.

392. In placenta lateralis, too, cases have been met with where, after the spontaneous detachment of only a portion of the placenta, and without interference, the bleeding has ceased. There is a line, then, corresponding to the expansion of the os, sufficient to admit the passage of the fœtal head, above which placenta is safe, and under which separation and bleeding are unavoidable.

Upon this theory Dr. Barnes advocates the artificial separation of the placenta, up to this line of demarcation between the perilous and the safe, believing that less blood will be lost than when detachment is allowed to be done by the intermittent uterine contractions, and that then the labor may go on more safely. If vigorous contractions did not follow, these would require to be excited by oxytoxics or other means; and if hemorrhage still continued, various anti-hemorrhagics would have to be employed. Dr. Barnes does not say that this plan will entirely stop the flooding. At the same time he believes that it will conserve blood—that a smaller amount will be lost than when the detachment is more slowly effected by the natural powers.

Method of Performance.—When the os uteri is a little opened up, a finger or two is to be introduced within the uterus, the membranes ruptured, and the fingers made to sweep round between the placenta and uterus on the side to which the main bulk of it adheres, thus separating it.

393. *Merits and Demerits of the Barnes Operation.*—Artificial partial cervical detachment presents a better prospect for the child than the entire method of separation; but we regret to say that we are unable to believe that there is a better prospect for the mother than by version. We believe that bleeding takes place from the detached portion of the placenta, to a certain extent, and also to a large extent from the valveless veins of the uterus; and we think that the recurrence of the uterine contractions tends to keep up the hemorrhage from the uterine vessels until some part of the child descends and compresses these. We do not doubt that there is a physiological limit to the extent of placenta liable to detachment during the expansion of the womb; but we question whether, when you have attained that line, when separation has been effected up to that limit, hemorrhage is likely to cease—that is, as a pure result of the detachment. We hold the view of Credé, Zeitfuchs, Radford, and others, that when it does stop after this, the cause is compres-

sion by some part of the fœtus; that a plug is given to us by fœtal descent. We have seen bleeding to a considerable extent after this separation, and have heard of other cases where it occurred. The cause of the continuance of the hemorrhage after detachment (a hemorrhage, be it observed, springing from the uterus below the line of Barnes, and partly from the placenta) we will endeavor to explain. The lower segment of the uterus, the cervical zone, is organized chiefly for purposes of expansion. Its anatomical and histological characters show this. In the first place, while the peritoneum in the body of the uterus is very closely connected externally with its middle muscular coat, between it and the cervix, in the part invested by peritoneum, and between the cervix and bladder in the part not covered, there is much loose connective tissue. Second, in the cervix the middle coat, as shown by M. Jobert, consists of semi-circles of muscular fibres, which decussate without mingling; the arrangement is circular mostly, and interspersed, and preponderating over the muscular tissue, is a large amount of elastic fibrous tissue. Third, the mucous membrane is marked by multitudinous primary and secondary plicæ or folds, which are doubtless for affording immense capacity of distension, in addition to presenting broad ground for the mucous crypts.

394. Here, then, we have a part specially adapted for expansion—endowed with the power of unfolding to a great extent. Having pointed out this character and capacity of the cervix, we have now to add that we agree with those who hold, contrary to Wigand, Michaelis, Rigby, and others, that during a uterine pain the cervix is not in a state of contraction, but of expansion and dilatation. Wigand's view, that contraction begins at the cervix, is now denied by some distinguished obstetricians, such as Scanzoni (Lehrbuch der Geburtshülfe, p. 173), and Braun holds the same opinion. During a uterine pain, then, contraction begins at the fundus, and extends toward the body; but the cervix is exempt—it is in a state of expansion. It is here that we differ from the able author of the Lettsomian lectures on placenta prævia. Dr. Barnes holds that the os is opened by the contraction of the cervical longitudinal muscular fibres. (See Placenta Prævia, p. 54.) We maintain that there is no contraction, but, on the contrary, passive dilatation. The forcing down of the contained body or the bag of waters produces this, and not the longitudinal fibres alluded to. This a beautiful and beneficial arrangement; for were the cervix not thus passive, did it, as represented by Dr. Barnes, contract actively, see what an obstacle it would present to delivery. Doubtless the powerful contraction of the upper zones would overcome it; but then what function can cervical contraction subserve at this time? But, in addition to passive expansion, we have, as pointed out by Tyler Smith, an active dilatation. We may state also that the late distinguished Sir Charles Bell held this same view in regard to the os.

395. If these views, then, which we have stated be correct, it follows that, until a part of the fœtal body comes down and compresses the cervical vessels (and placenta), we are in danger of flooding, unless, indeed, clots gather at the mouths of the vessels and prevent it. When, by the descent of the contained body, too, the cervix is greatly distended, its vessels are also, to a certain extent, compressed by the mere stretching, and thus bleeding is checked. Uterine contraction, then, being fundal, and in the body of the uterus, and not in the cervical zone, we obtain no hæmostatic benefit from it here *per se;* it only contributes to the arrestment of the flooding in proportion as it propels the child, and thus causes

compression of the vessels, and extreme distension of the cervix. Holding these views, we cannot share the confidence felt by Dr. Barnes in the superior advantages of his operation; at the same time, we can believe that it has often succeeded well, especially when followed by active and vigorous contraction of the upper zones, and the steady advance of labor.

396. **Cohen's Plan of Partial Cervical Detachment.**—Dr. Cohen of Hamburg, in the Monatschrift für Geburtskunde, 1855, gives an account of a method of his own, which he says has been extremely successful. He does not go the length of Dr. Barnes, and liberate all the cervicozonal afterbirth; he contents himself with detaching a segment of it, viz., that which is affixed to one side. He introduces a finger or two into the uterus so soon as the os will admit of it, ruptures the membranes during a pain, tears the membranes from the edge of the placenta, and then, by sweeping the finger round, detaches the placenta completely from that side of the uterus to which the smaller portion is adherent. We should state that previously he makes out by the *toucher* on which side the largest portion is adherent, then, as stated, he separates the smaller part, which is carried, as the os dilates, to the side where most of the placenta is attached. We have no doubt that this method of Cohen has, as alleged by him, been successful in many instances; but, as he has not given cases, we are unable to say whether the separation *per se* was the cause of the success, or whether it was not due to more vigorous and frequent uterine contractions setting in after the rupture of the membranes, and forcing down the fœtus. We believe that the good he thus obtained was greatly owing to its facilitation of ostial and cervical dilatation, and, consequently, fœtal descent. In this way, too, fewer uterine vessels are opened up. The facilitation of ostial expansion is a great matter in these cases, for it permits of more rapid fœtal expulsion. When you have a case of placenta centralis, you have the os and cervix prevented from expanding freely, and thus fœtal descent is impeded.

397. **Tampon or Plug.**—As regards the employment of the plug in placenta prævia, there are conflicting opinions held, some considering it useful, and others not. The highest function which it can subserve is that of a temporary expedient, until other means are practicable. For instance, if there be a rigid and undilatable os, debarring entrance into the uterus, and flooding going on profusely, it may, if carefully applied, stem the tide until the os expands and admits of operative procedure. We say, carefully applied, because we remember most vividly an instance of this complication, where the plug was expelled by pent-up blood in the doctor's absence, and with it, and behind it, an immense discharge of clots and fluid blood. The plug was carefully and well applied, too, in this instance. We have never been an advocate of the plug here; indeed, we were in the habit of decrying it, sharing, as we did, the views of Merriman, Gardien, and Hamilton; but we are free to confess that we have resiled somewhat from that position, and now think we may on some occasions gain advantage from it. The objections to the tampon were these: It was supposed that though preventing the flow of blood through the vagina, externally, it would not avert internal bleeding, and that this might go on unseen by us to an alarming extent. This, however, can hardly happen. The blood can only flow toward the lower part of the cervical zone and the vagina, and if this latter is closed by padding, it cannot escape, but is likely to become coagulated above it. Notwithstanding all this, we are not to lay great store by the plug, know-

ing that it is but a temporary thing. It does not carry us out of the region of anxiety; our goal is the complete evacuation of the uterus, and to that end we hasten with all safe and justifiable speed. When that is accomplished, or what is next best, if we get the length of securing a leg, then we have gained a great deal. What makes us less zealous, indeed, almost indifferent, as regards the plug, is this: that like Dr. Ramsbotham and others, we have never had much difficulty in dilating the os, unless in very premature cases. In dilating, as before said, we must not be rough. Here the caution is doubly requisite, because, from the increased vascularity of the cervix, it is more easily lacerated.

398. *What is the Best Plug?*—The common method has been to insert sponge into the vagina, or long strips of lint, dipped, perhaps, in some astringent; or cotton-wool saturated, or not, in dilute tinct. ferri. perchlor., or in iced water, or solution of tannin. An excellent method is by the fiddle-shaped water bags of Barnes. With these you are able to plug, as well as to dilate gradually.

Colpeurynter.—An India-rubber bag (Braun), filled with iced water, is also a very useful tampon.

Vaginal plugging, however, is not altogether satisfactory. It may remain in, in some cases; but in others, such as the case we have referred to in connection with this subject, it falls out, or rather is expelled. This is owing to the fact that it excites the vagina to contractile and propulsive action. Or, if it is not extruded, being compressed by the vaginal contractions, the blood readily passes it and escapes externally.

Plugging the Cervix.—This we have noticed under abortion, where it is often of great utility.

399. (7.) **Temporizing Plan by means of Rest and Hæmostatics.**—This is recommended where a little blood has come away, yet where labor has not set in. The woman may not have gone to the full period, and the os may perhaps be closed. The patient is made to rest quietly on a hard bed, in a cool room, and to have a cooling regimen and astringent medicines, such as gallic acid, or the liquor. ferri. pernit. The iron preparation is both tonic and astringent, and may conduce sooner to the making of new blood. We are not in favor of a temporizing plan after the 7th month, being impressed with the dangers of delay in such cases. Blood coming away is with us the signal for action. Especially is the temporizing method to be condemned in country practice, or where the practitioner may reside a great distance from his patient. The flow may be small at first, but some other day it may escape so freely as to kill the woman before the arrival of her physician. Numerous instances might be given in impressive illustration of this had we space. To find a pregnant woman bleeding from the uterus, then, and to go away and leave her after prescribing a little gallic acid, etc., by the mouth, would not, in our humble estimation, be a warrantable step, because an uncertain one. It would be as foolish as to ignore a small fire in a building, and delay sending for the means of extinguishing it until it were nearly consumed.

400. (8.) **Induction of Labor on the first appearance of Hemorrhage.**—The mortality of placental presentation is largely due to the loss of blood, or the effects of that loss. The other death-factors, such as metritis and phlebitis (tetanus is so rare that we need hardly name it here), work smaller evil in this grave complication. This hemorrhage may not be so great, as a rule, in cases where the placenta is not

adherent all round the neck of the uterus, but sometimes even in these it is alarmingly profuse. Dr. Robert Lee, a gentleman of vast obstetric experience, and who dealt with many instances of this complication, acknowledges this. (See Theory and Practice of Midwifery, p. 372.) He adds, also, that though the first flooding, which usually takes place in the 7th or 8th month of gestation, is rarely fatal, yet sometimes it is so, and he cites cases in proof. Bleeding, then, is the great thing to be dreaded in placental presentation, and the question is how to avert that drain of the vital fluid in the cheapest way for the poor woman, in the manner least likely to inflict other evils upon her. We have noticed several of these methods already, many of them of utility, but marked also by an amount of uncertainty as regards results which impels us to seek for, if possible, other more favorable plans. The one we have to suggest (with, we trust, a full sense of the responsibility inseparable from rule-giving in a complication so grave) is this, that labor be induced artificially on the appearance of the first hemorrhage, if the flooding be very profuse; and if the flooding does not of itself set up labor. We do so in distorted pelvis, necessitating craniotomy, which has a mortality hardly so great as this complication ; and if so, is it not equally justifiable here? In such cases it is perhaps done greatly with the view of preserving fœtal life, but partly, also, to avoid the maternal evils of the operation ; and in Britain, at least, the majority of obstetricians hold the mother's life to be the most valuable, and shape their practice according to this doctrine.

401. **What Method of Induction of Labor should we adopt in Prævial Hemorrhage?**—We have already seen that there are numerous plans for this purpose, some of them very efficient, others less so; but it is obvious that several of these are quite inapplicable here. For example, were we to adopt the method of Kiwisch, we would be certain to separate the placenta and induce serious hemorrhage ; and the same is true of other plans, which consist of an invasion of the uterus. The line of proceeding we recommend is based, on the one hand, on a consideration of the relation subsisting between the vaginal excitor-nerves and the motor-nerves of the uterus ; and, on the other, on the influence of purely centric spinal action. No one has more clearly or forcibly pointed out these than Tyler Smith, and the chapter in his work devoted to the nervi-motor functions of the uterus will well reward a careful perusal. The vagina, then, when irritated, is a most potent excitor of uterine action, and advantage may be taken of this to excite the pains of labor. A tampon, made of compressed and carbolized sponge, is to be inserted into the vagina, and permitted to remain and expand for twenty-four hours. The woman must lie either on her back or side, with the pelvis a little raised. If labor be not excited by this time, then the sponge is to be withdrawn and a larger one introduced. At intervals the uterus is to be gently pressed on through the abdomen, over the insertion of the oviducts, by the nurse, and a brisk cathartic is to be given. These means alone will generally prove sufficient in this complication, for it must be borne in mind that the bleeding is itself a factor, and not seldom induces premature labor. As labor advances, we must endeavor to turn, as before noticed. A foot may be more readily got hold of in some of these cases, for at this earlier period of utero-gestation it is frequently nearer the os.

We had written the foregoing chapter before recollecting that Dr. Greenhalgh, of St. Bartholomew's Hospital, had proposed a somewhat similar line of treatment several years ago. We were looking over some numbers of the *Lancet*, when we alighted upon it. We cheerfully concede priority to Dr. Greenhalgh, and beg to state that we have frequently benefited by his suggestions, not only in this, but also on other obstetric subjects. Let the student note, however, that our method differs in some essential points from that of Dr. Greenhalgh. He uses an air-ball, covered with spongiopiline, as a tampon and excitor, and that is all right enough ; but he further prescribes oxytoxics, such as ergot, borax, etc. Well, these remedies may be indispensable in some cases ; but if we can induce labor without them (with the vaginal excitor, plug, abdominal friction, and a brisk cathartic), it is much better. The reasons are: When you give an oxytoxic such as ergot, and especially in these premature cases, you are very apt to induce tetanus of the womb. If you do not, you are at least likely to excite rapidly recurring contraction ; and in either case you are much impeded if you have to perform version. Moreover, you run the risk of killing the embryo, both by this tetanus and by the toxæmic influence of the ergot. Now, by our plan the infant has rather a better prospect of survival ; that is to say, if the first flooding has not set in until after the period of viability. In the majority of cases the hemorrhage does not begin till after this ; so our induction of labor here, just as in distorted pelvis, offers us the chance of saving the infant, while it will tend, we are fully persuaded, to diminish vastly the mortality of the mothers.

CHAPTER XL.

POST-PARTUM HEMORRHAGE.

402. We have seen, under natural labor, that a sanguineous discharge takes place from the uterus for a longer or shorter period, and without leading to evil results; but sometimes this is so profuse as to be absolutely alarming and dangerous. The source, of it may either be the uterine vessels, exposed by the detachment of the placenta, or some rupture of the cervix, or laceration about the vagina. The most common cause of it is the want of proper and vigorous uterine contraction—atony of the uterus. When we find the uterus firmly contracted into a round tense ball, we have little apprehension of serious flooding. Sometimes, however, it contracts pretty well, and then relaxes alarmingly again, permitting the escape of a deal of blood. The experienced obstetrician can sometimes even predict hemorrhage, and thus adopt means for its prevention or moderation. Nowhere in obstetrics is the faculty of prophecy more valuable. The cases we allude to are those where, during labor, the pains have been weak, somewhat irregular, and of short duration, impelling the child on (in the second stage) a bit, but permitting of its retrocession immediately again, and for a considerable distance back. Often in such circumstances we have witnessed post-partum flooding; but now we give a liberal dose of ergot at the end of the second stage, and with excellent results.

May there be flooding in presence of a Contracting Uterus?—Gooch, Rigby, and Valpeau held that there could ; and Dr. Ramsbotham pointed out that this was owing to contained clots of blood. There have been recent attempts made to shake our confidence in the hæmostatic value of uterine contraction. We have replied to these in a paper in the Transactions of the Edin. Obstet. Soc., vol. iv., p. 277. We may rest assured that firm contraction is the great means of preventing flooding, by supplementing the thrombosis of the uterine vessels, and that any hemorrhage present during contraction. must be due to clots being expelled, or arise from ruptures or lacerations more or less extensive. Contraction, then, we repeat, is the great natural hæmostatic.

403. **Secondary Hemorrhage, Post-Partum.**—Flooding sometimes occurs after the subsidence of the usual discharge attending labor. It may happen at any time, from a few hours after the birth of the child on to a week, or even a month. Sometimes, just after your arrival home from, it may be, a happy labor, one where everything has gone well, and where you have left the mother with an excellent pulse, etc., you are summoned back with all possible speed, owing to a grave hemorrhage having set in. Some authors portray in graphic and impressive phrases the lying-in room which is the scene of a dangerous flooding; and, really, it is hardly possible to magnify the gravity, or over-rate the duties and responsibilities, of such an occasion. After everything proceeding felicitously during labor, it may be, you have the life's-blood suddenly gushing away, and the vessels whence it so profusely drains necessarily defy acupressure, or torsion, or the ligature—any of those means, in short, with which the surgeon binds the largest vessels in the body. It does behoove the accoucheur, in such circumstances, to know his peculiar work well, and also to add to his knowledge the most unwavering decision and the highest dexterity. There is time for consultation in various obstetric operations, but here there is none; every second is precious, and if you lose many seconds you may lose a life, the loss being all the more sad that the patient had got happily through her labor. This applies, however, more to the hemorrhage attending labor.

Causes of Secondary Flooding.—Retention of firm clots; portions of the placenta; retention of a separately developed placenta (spuria or succenturiata); interruption of uterine contraction from debility ; hepatic disorders. Relaxation of the uterus is a common cause; and the same is true of retained clots or pieces of membrane. Other causes are inversion of the uterus; polypi; ulceration of the cervix; inflammatory thrombus of the cervix; malignant disease of the womb.

404. **Treatment of Post-Partum Hemorrhage.**—In the treatment of flooding we have various reliable resources, and we are in the habit of selecting our means according to the nature and extent of the discharge. If it arises from uterine inertia, and you have persistent relaxation, ergot should be given, and pressure made by the hand firmly over the uterus. By grasping the uterus firmly, we can compel it to contract, or rather we thereby effect artificial contraction. Cold water may be poured over the uterus, applied to the genitals, or injected into the vagina. Of course, we must ascertain that no clots are retained; if so, they must be scooped out with the hand. We have seen most vigorous contraction follow the introduction of the hand for this purpose. In moderate hemorrhage, a little ergot and pressure over the uterus often prove quite sufficient. Scanzoni has used enemata of cold water extensively. In more serious cases, iced water has been injected into the uterus by Dr. Tyler Smith. Dr. Barnes (Obst. Oper., p. 394, 2d ed.) recommends in serious cases the "slow injection" of a solution of perchloride of iron (one part of the

strong liquor to three of water) into the uterus. Half an ounce at a time is enough. Previously to this he recommends us to try the application of this solution by means of a bit of sponge on a whalebone stem; but often it is difficult of introduction. Kiwisch and Outrepont have also recommended it. It is a powerful hæmostatic here, and may be tried in the more desperate cases. We have used with success a powerful solution of tannin, gr. xx. to the oz. of water. If the bleeding has occurred before the removal of the placenta, we should endeavor to get the third stage compleetd. We are astonished to find so intelligent an author as Dr. Gunning Bedford, of America, almost ridiculing this proceeding. (Princip. and Pract. of Obstet., 4th ed., p. 392.) He says, "it is not a bleeding surface;" and certainly this is correct enough, when it is lying detached in the uterus; but to conclude, as he does, that therefore it cannot conduce to flooding is, to use his own words, "a perfect delusion." Rely upon it, that the uterus cannot close, by contraction, its open vessels so thoroughly when the placenta is within it as when it is delivered. True, the afterbirth may, to some extent, mechanically hinder the flow; but that it does not prevent it—nay, that it favors it, is shown by experi ence. It may be almost laid down as a law, that there s always more blood lost the longer the afterbirth is in being expelled. Further, you may meet with cases where a part is attached, and the remainder not, and thus flooding could not fail to occur.

There is another efficient method that may be adopted in dangerous cases—a method practiced by Gooch. Yon introduce the hand into the uterus, and make pressure with the fingers on the utero-placental vessels, at the same time making counter-pressure externally with the other hand. This is combined manu-pressure, and very efficient it is.

The application of the child to the nipple has a good effect in some cases. It is suitable where there is a tendency just to a little excess, the first or second day.

405. **Compression of the Aorta.**—This plan was suggested by Saxtorph, and, doubtless, if it could be carried out well, it might be good. In females much beset anteriorly with fat, it could not be easily done. There is one thing the operator would require to avoid—viz., pressure on the *vena cava*. Were this to happen, matters would be made worse. Compress the artery, but not the vein, if you wish to gain your object. Beside direct, there is indirect arrestment, gained by this proceeding, for that renowned physiologist, Brown-Séquard, has pointed out that uterine contraction is remarkably promoted by arterial pressure.

Tampon.—The tampon is only named here to be condemned. Granted that it is useful when the uterus is full, as in prævial flooding; the same cannot hold good here, and for the readily perceived reason, that by it you can do nothing whatever to restain internal bleeding. You may secure that it does not appear externally, but what does that signify, when all the time the uterus may be filling its cavity with blood? In fact, the woman may bleed to death, and you not see a drop externally. Were you in such circumstances—seeing no blood coming away—to conclude that the female was safe, you would be immensely mistaken.

In the discharges depending on uterine disease, etc., and where there is no sudden and profuse hemorrhage, advantage may be taken of some of the astringent medicines, such as Indian hemp, gallic acid, liquor ferri pernit., spirits of turpentine, acetate of lead, matico, and ergot.

406. **Treatment of the Constitutional Results of Hemorrhage.**—You may have succeeded by one or more of the aforesaid methods in

arresting post-partum flooding, and yet found your patient left so deplorably weak as to be ready to succumb to a mere breath. She may have been left with scarce sufficient blood to maintain the indispensable acts of circulation and respiration. She may require transfusion (of which we shall treat immediately), or, if not, she will need the materials that can be elaborated most readily and speedily into blood, and that without delay. She must be made to lie strictly recumbent, kept very quiet, and be fed by the nursing cup as she lies. Were she to sit up, a mortal syncope might seize her.

It has been proposed also in those cases of profound exhaustion to make pressure on the principal arteries of the extremities by means of the tourniquet, thus maintaining more blood in the region of the heart and brain. We see no objection to this procedure, and think that it may probably be of service.

CHAPTER XLI.

TRANSFUSION.

407. The system is often so immensely prostrated by hemorrhage as to be utterly unable to assimilate the nutriment conveyed by the stomach. In those cases where the female is blanched, and loses voice and muscular power; where the pulse is absent at the wrist, and there is great jactitation, the sympathetic seems incapable of performing its functions, and the assimilative processes are inoperative. Here transfusion may come in, and prove of service. Alas! it often fails to restore, but that is a charge that may be truthfully brought against many more of our remedies and means. Dr. Harwood, about a century ago, was the first to recommend it in women; but to Dr. Blundell is due the credit of having first employed it in puerperal cases. It was not without opposition, too, that he inaugurated the bold work; but that is the usual reward of the innovator. Dr. Blundel made experiments on various animals, and concluded that it was necessary to employ the blood of the same species of animal if success was to be attained, Dr. Brown-Séquard has corrected some errors into which Blundell, Bischoff, Prevost, and others fell. From extensive experiments, he has deduced the following:

(1.) Arterial or venous blood from any animal of any one of the four classes of vertebrata, containing oxygen in a sufficient quantity to be scarlet, may be injected without danger into the veins of a vertebrated animal of any one of the four classes, provided that the amount of injected blood be not too considerable.

408. (2.) Arterial or venous blood of any vertebrated animal, being sufficiently rich in carbonic acid to be almost black, cannot be injected into the veins of a warm-blooded animal without occasioning the phenomena of asphyxia, and generally death, after violent convulsions, provided that the quantity of injected blood be not below 1-500th of the weight of the animal, and also that the injection be not made too slowly.

Brown-Séquard attributes the non-success of Bischoff, Blundel, etc., with blood of a different species of animal, to four causes: (1.) The blood used was not fresh. (2.) Too much was employed. (3.) It was injected too quickly. (4.) That it was too rich in carbonic acid, and too poor in oxygen; the chief cause of failure being the last one, and next to it, the quantity of blood.

Dr. Brown-Séquard concludes also that there is no danger in employing the blood of cats, dogs, and various other mammals for transfusion into the human species. This is a most important discovery, for it might happen that no other blood could be obtained. He is of the opinion of Dieffenbach also, that defibrinated blood answers as well as that containing fibrin.

The quantity Brown-Séquard deems sufficient is from four to six ounces—that is, for an adult. It is perhaps as well to warm the blood, but not indispensable. The blood is to be received into a large open vase, and speedily whipped, then passed through a thick cloth, and injected immediately. The injection should be slowly performed; and if, after two or three ounces are transfused, there should be great increase of the respiratory movements, the operation should be suspended for about ten minutes. The middle basilic vein is commonly chosen. It is laid bare for about an inch, and isolated from the surrounding parts. A small opening is made on its anterior wall, and the end of the syringe cautiously inserted. Various instruments are used, but a brass syringe, air-tight, will answer. Dr. Hamilton, of Ayr, and Dr. Graily Hewitt, have constructed syringes which lessen the chances of coagulation; and Dr. Aveling of Sheffield has suggested the passing of a tube between the two veins—mediate transfusion—and has invented a useful instrument for the purpose.

409. Dr. J. Braxton Hicks has given an account of six cases in which he has operated, but unsuccessfully. He employed the gravitation tube and funnel of Dr. Hamilton of Ayr, and mixed a solution of phosphate of soda with the blood, in order to prevent fibrillation.

Professor Eduard Martin of Berlin has devoted one of his able monographs to this subject. His views are instructive. He differs from Brown-Séquard in regard to the kind of blood to be used. He thinks that human blood only should be employed. He is of opinion that the risks have been overrated, and that the danger of death from the entrance of air into the vessels is not so great as has been supposed. His deductions are made from the histories of fifty-eight cases of exsanguined and exhausted women, in a hopeless condition, forty-six of whom recovered. The following is his manner of operating: He selects a robust and healthy man, or, failing him, a woman no less *stark und gesund;* and, aided by one or two assistants, begins the operation. The median vein (unless it be too much collapsed, as it is likely to be in the exsanguined condition), or the cephalic, or basilic, is laid bare by a bistoury, by means of a cutaneous incision about an inch in length; then a curved trocar is inserted half an inch into the vein in the direction of the heart. An assistant performs venesection on the arm of the person selected to supply the blood, and the blood is received into a porcelain cup heated with warm water. The blood is then taken up by a glass syringe, kept heated by means of warm water to 104° F. The point of this syringe is then immediately introduced into the canula (the latter being held firm by an assistant, who removes the stilette), and the piston slowly pushed inward. The trocar is four and a half inches long, and the syringe holds fully two ounces. If more has to be transfused, care must be taken that there are no coagula in the canula or syringe. The latter should be washed with warm water immediately after. We judge by the pulse whether good is being got. If it becomes slower and more perceptible at the wrist, if the features brighten a little, and if the breathing is less hurried, benefit has been conferred.

In connection with this supplying of blood from the strong to the almost lifeless female, authors have properly pointed out that our work will be superfluous if there exists a non-contracting uterus. What matters it though we pour in blood in driblets, if it is ebbing out in a flood? We will spare no resource, then, in order to secure uterine contraction. With it, and careful and skilled transfusion, there is reason to be hopeful. Professor Martin's collection of cases is fitted to inspire hope, and to incite to the adoption of the operation in those cases of terrible flooding where the patient is brought to the very gates of death.

CHAPTER XLII.

PARTURITION.—CLASS III. COMPLEX LABOR.—ORDER IV. CONVULSIONS.

410. Another sombre cloud in the lying-in room, a terrible complication of labor, claims our notice—viz., convulsions. These may happen during pregnancy, or during labor, or after delivery.

(1.) **Hysterical Convulsions.**—This form happens commonly in the earlier months of pregnancy, and may arise from sleeplessness, indigestion, fatigue, emotion, or the general excitement common to the gravid state.

Symptoms.—The woman has a choking sensation, laughs, or sobs, and tosses about; at other times lies perfectly still. You diagnose it readily from the other varieties. There is no frothing at the mouth, no insensibility, no great contortion of the body; nor is the breathing stertorous.

Treatment.—Apply cold water freely on her, streaming it well on the face, and, if necessary, administer one or other of the anti-spasmodic trio—valerian, assafœtida, or ammonia. Clear the bowels well out, and recommend exercise in the open air. Let the woman also have some suitable mental occupation, on which she may concentrate a fickle mind, prone to dwell on the coming youth, and to conjure up no end of calamities.

Apoplectic Convulsions.—This form usually occurs toward the close of labor, and frequently, if a severe labor, where much voluntary work has been superadded to the involuntary of the second stage. This naturally leads to cerebral congestion. The attack is usually ushered in by head-pain.

The symptoms are, injection of the eyes, flushing of countenance, stertorous breathing, slow and full pulse, insensible pupil, coma. If there be congestion of the brain merely, some little hope may be left; if effusion, the case is very hopeless.

Treatment.—Push on the antiphlogistic treatment with celerity. That does not consist now-a-days, as a rule, in withdrawing a flood of blood. Ice should be applied to the head, and counter-irritants to the lower parts. Enemata of turpentine also helps. If the woman stands out, vesicants to the head come usefully in.

By all means empty the uterus without delay (if the apoplexy has developed during labor), either by version or the forceps.

411. **Epileptic Convulsions.**—Now we come to the most prevalent variety of convulsions occurring in the puerperal state, and which calls for more extended and careful consideration.

Statistics.—This form occurs about once in 600 cases, and formerly killed 1 in 4½ of the mothers. We say formerly, because we cannot believe that, in the days of chloroform and chloral, the rate can be so high. Primiparæ are most liable to be attacked. Dr. Collins found that, of 30 cases which he had, 29 were first labors; and of Dr. Merriman's 36 cases, 28 were also first. Women with "short, thick necks, and of a coarse make," are most liable, according to Collins; as for ourselves, we have seen convulsions in women differing widely in these respects.

Causation.—The etiology of convulsions received a flood of light from the investigations of Flourens and Marshall Hall. Flourens showed that no direct irritation of the cerebrum or the cerebral nerves could occasion muscular action, and that the spinal cord (including the medulla oblongata, pons, crura, and tubercula quadrigemina), that is, the irritation of it, is the producing cause. A step farther was made by Marshall Hall, who demonstrated that this irritation might be caused by certain incident or excitor nerves; thus opening up a wide and profoundly interesting field. In treating of the causes of convulsions now, we simplify matters much by dividing them into the centric and eccentric, as has been done by Tyler Smith in his able work.

Centric Causes.—These may be intra-cranial as well as inter-vertebral, because, as before stated, part of the true spinal system has an intra-cranial habitat. Intra-cranial causes are, cerebral congestion, or effusion of serum or of blood, or any brain disease sufficient to occasion compression. By this pressure the medulla, etc., is affected indirectly. The inter-vertebral causes may arise from disease of the cord or of the meninges, hyperæmia, or anæmia of the same. An impure condition of the blood circulating in the vessels of the cord is another cause. This includes the different toxæmias, a most important one being connected with albuminuria. Of this we must speak at length further on. Disorders of the liver also lead to blood impurities sufficient to provoke eclampsia. While convulsions are produced by these physical causes, there are also psychical ones to be noticed—emotions of diverse kinds, whether of intense fear or pleasure, astonishment, grief, or shame. We remember well that our first case was an emotional one, caused by the entrance into the lying-in room of a stranger. The female was one of the most sensitive to be met with, and has proved herself, since that occasion, to be very prone to excessive nervi-motor action. It is generally remarked that many cases happen in women unmarried, owing, perhaps, to grief, or remorse, or shame. Tight-lacing, too (from a desire to mantle the abdominal tumor as long as possible), has, perhaps, something to do with it, the pressure thus exerted leading to albuminuria, or other visceral disorder, and thus producing toxæmia.

412. *Eccentric Causes*, or those due to irritation of incident nerves. These are (following Dr. Tyler Smith largely):

1. Irritation of spinal excitor nerves of the uterus and passages.
2. Irritation of incident nerves within the cranium.
3. Irritation of incident spinal nerves of rectum.
4. Irritation of incident spinal nerves of ovaries.
5. Irritation of gastric and intestinal branches of the pneumo-gastric nerves.
6. Irritation of incident spinal nerves of bladder.

7. Irritation of cutaneous nerves of the mamma, and of the hepatic and renal branches of the pneumo-gastric.

(1.) *Irritation of the Uterus and Vagina.*—This may occur during the period of gestation, during labor, and after it. When convulsions occur during pregnancy, the most common time is between the 7th and 9th month. Dr. Tyler Smith lays greater stress on irritation of the vagina than of the uterus, the former exciting much more extensive reflex muscular actions than the latter. The pressure of the head on the os and vagina is the occasion of the irritation, and this is usually greatest in primiparæ; thus accounting for their greater frequency in the latter. More cases occur, too, with head presentations than with any other. While the pressure of the head is thus a chief cause, it has to be remarked that the simple presence of the fœtus in the uterus is sometimes enough. The irritation of a dead fœtus is also sufficient in some instances. When once the fits have been initiated, they are liable to be excited by very slight causes. We have met with cases where, on introducing the hand for the purpose of removing the placenta, violent convulsions have set in.

(2.) *Irritation of Incident Intra-Cranial Nerves.*—This is another eccentric cause. The irritation may be due to meningeal inflammation, to osseous tumors, or to clots pressing on the membranes.

(3.) *Irritation of Excitor Nerves of Rectum.*—Worms, indurated fæces, drastic cathartics, fissure, and piles, have caused epileptic fits, and are all the more likely to do so when gestation or paturition co-exist.

(4.) *Ovarian Causes.*—Morbid conditions of the ovaries may irritate the spinal system reflexly, with sufficient strength to produce convulsions.

(5.) *Stomach and Intestines.*—Various kinds of food of an indigestible kind may produce convulsions, by irritating the terminal branches of the pneumo-gastric.

The irritation produced in the intestines may arise from worms, improperly digested food, or vitiated secretions.

(6.) *Bladder.*—Calculus, retention of urine, strangury, may give rise to sufficient irritation.

(7.) *Mamma.*—Cracked or chapped nipples have occasionally given rise to so much pain and irritation as to produce convulsions. The liver and other organs supplied by the pneumo-gastric are adequate excito-motor organs when disordered.

413. **Symptoms.**—Pain in the head, nervous irritability, restlessness, confusion of ideas, twitching of various muscles, a peculiar fixed stare, precede and herald the fit, which is similar to that of epilepsy, with this difference only, that there is a succession of convulsions.

Treatment.—The remedies to be employed differ, as do the causes and sources of the irritation. If an overloaded stomach be the cause, unburden it by the speediest of emetics, such as sulphate of zinc or mustard. If the bladder is at fault, treat it according to the nature of the disorder. After clearing it out, soothe it by morphia injections. This will not be absorbed so as to do harm. If it is a cracked nipple, get it soothed and healed. If they arise during pregnancy, whether from a dead child or not, unless other means cure quickly, we ought to induce labor.

Bleeding.—What about bleeding here? It has been common to bleed largely in such circumstances, but this treatment is now much more rarely pursued. Modern pathology is rather against it, as we shall see. We may run briefly over the arguments in favor of caution in this way.

We shall see immediately that uræmia plays a very important part in the majority of these cases; but let us first listen to the pathologists.

We may begin with our countryman, Dr. C. B. Radcliffe. He wrote in the *Lancet*, some time ago, that "the clinical history of disease is opposed to the theory that would ascribe convulsions to congestion of the cerebral veins. In pertussis and pulmonary congestion these veins are greatly engorged with black blood; yet the consequences are dreamy sleepiness, stupor, perhaps coma, rarely convulsions. When extreme venous congestion is brought about by straining, etc., the result is the same—coma, apoplexy, paralysis, not epilepsy." Kussmaul and Jenner proved by experiments that convulsion was occasioned rather by an anæmic than a plethoric state of the brain. Shrœder van der Kolk deems the primary cause a molecular change of the reflex nervous centres, not necessarily induced by congestion. Trousseau, Niemeyer, and others found that congestion was more an effect of the convulsion than the cause. There is, then, a widely increasing belief that the super-polarity of the nerve centres—the ganglionic cells—is brought about more frequently by anæmia and by blood-poisoning than by congestion.

414. If such be the case, we are to be cautious with the lancet, and only to employ it when swollen veins and a full and corded pulse, etc., testify to an extreme and hurtful plethora. We say, a hurtful plethora, for in some cases it may help to prolong, if it did not originate, the convulsions. Passive engorgement of the lower section of the cord has been found by the pathologist in some of the cases which proved fatal. Even that, however, may have been an effect and not a cause, and we are not to be blindly led by *post-mortem* changes. If anything should teach us caution in this respect, it would be the *post-mortem* alterations common to some parts of the body, such as, for example, the stomach. From phlebotomy, then, we are in general to refrain in puerperal eclampsia, knowing that the congestive theory stands on a feeble pedestal, if it has not been overthrown.

Opium.—What of this drug here? It is not safe; indeed, it is very unsafe in plethoric females. If we wish to induce congestion of the nerve centres, then an effectual plan is to give opium. In anæmic cases it may not prove so directly hurtful; but still even here it is detrimental, by aggravating debility, congesting the depurative organs, and undermining digestion.

In convulsions it is good to have the bowels well opened, and afterward to throw up counter-irritant enemata, such as turpentine. A favorite clyster with us is an ounce of turpentine, 30 minims of aq. ammon., 30 minims of tinct. camphor, and 10 ounces of warm water. It is common to place a drop of croton oil on the back of the tongue, so as to operate on the entire canal. Ice to the head is a useful auxiliary, with counter-irritation to the extremities. The inhalation of ether or chloroform is of great service in puerperal convulsions. With chloroform we diminish the frequency and force of the fits, and in some cases apparently banish them.

415. But another remedy now demands notice, as of very great utility in this serious complication—we refer to the hydrate of chloral. We believe that we reported, to the Obstetrical Society of Edinburgh (1870), the first case of puerperal convulsions treated by chloral in Scotland. At least, Sir James Simpson, who was present, said that, so far as he was aware, it was the first. This case, which was due to emotion (a

fright), and therefore less amenable to treatment, proved eminently successful. The chloral arrested the convulsions at once, and induced a profound repose, from which the lady awoke refreshed, and free from any evil after-effects. There is now a long list of equally favorable examples scattered through the various journals. As regards the dose, we think 40 grains enough to give at once; if that does not induce sleep, it may be repeated. But we must take care not to give too much, 140 grains being viewed as a poisonous dose.

If the convulsions have occurred before the close of labor, it is usual to expedite delivery, on the ground that the peripheral irritation arising from the pressure of the fœtus, either on the cervix, os, or passages, is producing the fits. If the head is well down, the forceps will be suitable; if higher up, version will likely answer us better. Before the days of anæsthesia, the violent contortions of the woman impeded operative procedure very much; but now she is lulled into an unresisting repose. The emptying of the uterus does not always banish the fits, but often does; and, moreover, gives a fairer field for the play of the remedies which we select. Besides, we may save the child, for, when convulsions are protracted, the latter often perishes.

The treatment, then, may be summed up thus: Moderate bleeding, where there is considerable plethora; chloroform inhalation, or chloral; with ice to the head and spine, and counter-irritation at the extremities.

CHAPTER XLIII.

URÆMIC CONVULSIONS.

416. There is an albuminuria of the gravid state which, if not absolutely harmless, is, at least, not attended by evil consequences fitted to excite notice. We refer to that due to pressure on the kidneys, and common to primiparæ especially, and where the albumen is of limited amount. There is another and graver toxæmia, where the quantity is much greater, and the results much more serious, and to that we shall now refer. The connection between albuminuria and puerperal eclampsia was first called attention to by Sir James Simpson and Dr. Lever, nearly thirty years ago; and since that time it has not failed to engage the earnest attention of the leading obstetricians in this country, and in Germany and France. Learned societies and academies of scientific men have discussed the subject with the greatest warmth and interest, and even at the present time the embers are often disturbed. The chief controversy has been in regard to the causes of the albuminuria, the relation of this to urea, and the relation of the latter to eclampsia; also, whether urea be the immediate cause. The convulsions of albuminuria, or uræmia, generally occur during labor. The blood is rendered imperfect by losing albumen, and impure by retaining urea. How does the toxæmia operate? Sir James Simpson's view was this: He believed "that the impure blood produced a preternatural excess of irritability or polarity of the nervous system, but more particularly of the spinal system of nerves, and in this way a morbid predisposition to

convulsions, from irritation of the uterus, vagina, etc., that would be incapable of producing this convulsive effect were not the polarity of the spinal system for the time being highly exaggerated."

One keenly canvassed point is this, viz., whether the urea is the poison that does the mischief, or whether this is not rather changed by fermentative process into carbonate of ammonia, the latter then being the immediate cause.

417. The reason that leads some to doubt the urea lies here—it is found to exist in many cases without leading to convulsions. The view of Frerichs was, that the convulsions were caused by imperfect excretion of urea, and that the urea, accumulating in the blood, become decomposed into carbonate of ammonia. A good many opposed this doctrine, their opposition being based, like Frerichs' opinions, on experiments. It was found that in animals from whom the kidneys had been removed, while urea in excess was found in the blood, yet no ammonia was discovered. Then Oppler found that the convulsions produced by injecting carbonate of ammonia into the blood were different in their character from these of a uræmic toxæmia. This skepticism in regard to the ammonia doctrine waxed strong, and Dohrn, a year or two ago, almost went the length of a total repudiation of it. In a recent part of the Archives of Gynæcology, Spiegelberg has come strongly to the rescue of Frerichs. He reports a case of puerperal convulsions where venesection was performed, and the newly-drawn blood subjected to a careful analysis by Gescheidlen. An excess of ammonia was found to be present, and there was also a great increase of urea. The urine was extremely albuminous, and wanting in urea. Spiegelberg, along with Heidenhain, injected carbonate of ammonia into the arteries and veins of dogs and rabbits, and found, contrary to Oppler, that uræmic phenomena were set up. There was first restlessness, then tonic and clonic convulsions; afterward, and finally, profound coma. The quantity of ammon. carb. employed by Spiegelberg was 1½ grains, four times repeated. The 6 grains were thrown into a large branch of the jugular vein of a dog, weighing about 7 lbs., and about 15 seconds after the last instalment was injected, general convulsions were produced, clonic spasms alternating with tetanic spasms, these giving way to profound coma. These experiments of Spiegelberg, one in every respect competent to undertake them, certainly tend to strengthen the faith of those who cling to the ammonia theory. It may be added, also, that Brown-Séquard has produced convulsions by injecting ammon. carb.; and Bernard has detected ammonia in the stomach and bowels of animals after removal of the kidneys.

418. **Causes of Albuminuria.**—We have already alluded to renal compression as a cause of albuminuria. Dr. Rose Cormack was one of the first to point out this; and Dr. Brown-Séquard satisfied himself of the truth of it by experiment. He placed a lady who suffered from albuminuria in the 9th month, in a position in which the pressure of the gravid uterus was removed, and the albumen gradually passed away from the urine. On resuming the ordinary position it re-appeared.

Condition of Kidney.—The kidney is altered to a condition resembling somewhat that common to an acute attack of Bright's disease. This must be only a temporary transformation, however, for within a few days after labor the urine improves, and in a week or two the albumen vanishes.

Robin thought it due to imperfect oxygenation of the albumen.

Dr. C. J. B. Williams was of opinion that congested kidney simply was the cause.

The symptoms of uræmia were produced by Marchand by placing a ligature on the renal nerves; and Kramer found that albuminuria resulted from a division of the sympathetic nerve in the neck. Claud Bernard produced it by puncturing the medulla oblongata; and Budge, by puncturing the cerebellum.

Frerichs, Meyer, and others discovered that it could be produced by ligaturing the renal veins.

Blot (De l'Albuminurie chez les Femmes Enceintes, Thèse, Paris, 1849) opposes the view of a structural disease of the kidney. He found women dying of it, and yet showing none of the pathological changes of Bright's disease, and also that the other characters of the urine were different.

One important point, enabling us to diagnose with greater accuracy, is this: In Bright's disease there is often a certain degree of amblyopia, and sometimes amaurosis, as we have seen; while in albuminuria, caused by the pressure of the enlarged womb and its contents, the retina is unimpaired.

419. **Relation of Albuminuria to Uræmia.**—While there has been great discrepancy of opinion in reference to the origin of the albuminuria, there has been no less in regard to the relation between albumen and urea. Rayer and others believed that, as the albumen increased in the urine, the urea diminished in it, and increased in the blood; but subsequent investigations have shown that this is not always the case. Robin, Franz, Simon, Brown-Séquard, Bernard, and a host of other authors, have now shown that albuminuria exists in connection with many diseases (such as erysipelas, fevers, measles, hepatic disease, etc.) without developing the phenomena of uræmia. Uræmic convulsions, then, we must conclude, have no direct connection with albuminuria.

We have now seen, though briefly, that there are not a few dark and doubtful points in regard to the etiology and pathology of uræmic convulsions yet; that, 1st, The cause of the albumen is not very clear; 2d, The connection between the albumen and the urea is not a little shrouded in mystery; and, 3d, That the relation of the urea to the eclampsia is yet enveloped in some doubt. There is thus a very tempting field still open for the exploration of the chemical physiologist, and which may yield in the future a glorious harvest of practical good.

But while there is no certainty in regard to these points, let us repeat that there is a strong probability—

1st. That the albumen is due to congestion of the kidneys.

2d. That there is a close relation subsisting between the albuminuria and the uræmic toxæmia.

3d. That the uræmic convulsions (ammoniacal eclampsia, we would now term it, after the recent experiments of Spiegelberg) are probably due to the decomposition of the urea into carbonate of ammonia.

420. **Consequences of Albuminuria in the Parturient Female.**—Sir. James Simpson held the following opinions on this subject:

(1.) "Albuminuria, when present during the last periods of pregnancy and labor, denotes a great and marked tendency to puerperal convulsions.

(2.) "Albuminuria, in the pregnant and puerperal state, sometimes gives rise to other derangements of the nervous system, without proceeding to convulsions, such as local paralysis (amaurosis, etc.), neuralgia, hemiplegia, and paraplegia.

(3.) "Œdema of the face and hands, going on occasionally to general anasarca, is one of the most frequent results of albuminuria in the pregnant female.

(4.) "When this œdema exists, we ought to suspect albuminuria; and if we find it on testing the urine, we should endeavor, by antiphlogistic treatment, to avert the convulsions.

(5.) "Albuminuria and its effects are far more common in primiparæ than in later labors.

(6.) "Albuminuria, with convulsions occurring in any labor later than the first, generally results from fixed granular disease of the kidney, and does not disappear after delivery."

Before proceeding to the treatment of this disorder, we may mention that Dr. Carl Braun of Vienna has written very ably on the subject. (See the translation of his work, "Uræmic Convulsions of Pregnancy, Parturition, and Childbed," by Matthews Duncan.) Dr. Braun calls it eclampsia puerperalis, and deems it "an acute affection of the motor functions of the nervous system (an acute neurosis of motility), marked by insensibility, tonic and clonic spasms." He says that "it occurs only as an accessory phenomenon of another disease, generally of Bright's disease in an acute form, which, under certain circumstances, spreading its toxæmic effects on the nutrition of the brain and whole nervous system, produces those fearful accidents." Braun is, therefore, of opinion that puerperal eclampsia is the effect of Bright's disease; but there are obstacles to our subscription to this doctrine, as we have seen. To repeat them shortly: (1.) Albuminuria exists often without structural renal disease. (2.) Bright's disease has existed without albumen being detected in the urine. (3.) Acute Bright's disease does not always go on to uræmic eclampsia. (4.) Fatal cases of this form of convulsions have been seen where no granular renal disease was detected.

There is only another thing we shall notice in connection with this subject—viz., that in the blood of the children who die (and they often die in this eclampsia) carbonate of ammonia has been discovered. Dr. Braun thinks that they are killed by the ammonia, and that where the mothers perish they are poisoned by the same substance. Some children born alive have died subsequently of uræmic convulsions.

421. **Treatment.**—If the eclampsia occurs before labor, we may endeavor to cure the uræmia by the internal use of colchicum and other diuretics, such as the acetate of potass, and juniper, etc. The inhalation of the oil of juniper has often a surprising effect in the way of reducing the œdema. We have employed, also, spongio-piline, steeped in infusion of digitalis, and spirit of juniper, over the abdomen with good results. Colchicum, we all know, is unrivalled in the way of promoting an increase of the urea in the urine. At the same time, we must treat the convulsions when they occur either with chloroform inhalation, or chloral. The former was thought by Sir James Simpson to be curative as well as palliative, and that its beneficial effect was due to its parting with sugar in the blood, the sugar then preventing the fermentation of the urea into carbonate of ammonia. A temporary diabetes mellitus is said to be produced by the anæsthetic. As regards the chloral, we are now employing it successfully in this form of eclampsia, as well as in others. A good dose of it (40 to 60 grains) should be given at once. Only, where we wish to deliver as speedily as possible, we will not find the chloral so use-

ful as the chloroform. Frerichs thought that the administration of benzoic acid (10 grain doses) helped to neutralize the carbonate of ammonia. Citric acid and dilute hydrochloric acid should, we think, be given; and why not large quantities of sugar? The bowels should be kept freely opened by hydragogue cathartics, such as the compound jalap powder, or scammony, or gamboge. Catheterism may be required if the bladder is not acting properly. The head is to be kept cool by the ice-bag, and the nape of the neck may be vesicated. Counter-irritauts over the loins are also beneficial.

Bleeding.—Bleeding is much more rarely resorted to, and it would only be justifiable to abstract a moderate amount where there was unusual plethora, and that just at the outset of the eclampsia.

422. *Question of Delivery.*—When the convulsions occur during labor (or even before it, when they resist treatment obstinately), the uterus is to be emptied by the method least productive of peripheral irritation. If the os is not open, and the head is high, we might try the combined method of turning. If we fail in this, we must dilate the os, either with warm water injections or with a Barnes' bag, the patient, of course being under chloroform. Then perform version by the ordinary plan. When the head is lower down we may succeed easily with the forceps. Dr. Braun recommends the introduction of a gutta-percha bag into the vagina; after which it is distended with warm water, as a means of effecting the distension of the os. We may state that even in puerperal eclampsia we have not hesitated to perform manual dilatation of the os. When the woman is thoroughly anæsthetized, the irritation does not excite convulsions. We fully agree with those who avoid embryotomy until absolutely impelled to it.

Sometimes mania has set in after these convulsions, especially if they have gone on long unmitigated. If this should happen, the patient must be kept very quiet, and large doses of bromide of potassium given. Chloral comes well in here also, securing as it does the much desiderated sleep. Counter-irritation may be required at the back of the head, and nutritious diet, if the woman is weak.

Induction of Premature Labor in Albuminuria.—This was proposed by Sir James Simpson and others, in order, if possible, to avert uræmic convulsions, and thus also save the child.

CHAPTER XLIV.

PARTURITION. CLASS III. COMPLEX LABOR. ORDER V. LACERATIONS.

423. **Rupture of Uterus.**—Of the various lacerations to which the parturient female is liable, none equal in seriousness—nay, fatality—that of the uterus itself. The lesion is most liable to happen during labor, but may take place prior to this, owing to accident, disease, or interstitial pregnancy.

Statistics.—It is difficult to gather trustworthy statistics, authors such as Burns, Churchill, Ingleby, Lehmann, and others, differ so greatly. Dr. Jolly, of Paris, one of the most recent authorities, in his admirable thesis (Rupture Uterines Pendant le Travail, Paris, 1873), estimates that the accident occurs once in 3000 cases or so. This is a marked diminution, contrasting him with Churchill and others; the former placing it at 1 in 1200. The accident then is happily not very common. Primiparæ are less liable to it than multiparæ. It may be added that the majority of the cases prove fatal and rapidly so.

Causation.—When rupture occurs during labor, the cause may be excessive uterine action. The fundus and body may contract violently, and the lower zone refuse, from preternatural rigidity, to dilate. In such a case it has happened that the cervix has been torn away. Operative procedure, such as turning in presence of a tetanically contracting uterus, or forcible and incautious use of instruments, may likewise occasion rupture. La Motte and Levret believed that the excessive tossing about, or convulsive movements of the fœtus, might cause it. If the uterine walls were attenuated by disease, this might happen; and, indeed, the uterine contractions during labor would then also be more likely to lead to rupture. Cases of scirrhus, softening, and gangrene leading to it, are reported. Distortion of the pelvis may help to produce it, by offering resistance to the descent of the child. The pains being violent, and the head not being able to enter the brim, may be forced through the walls of the uterus. It is usually the cervix that is ruptured in such cases, and Dr. Burns thought it was owing to pressure of it between the head and the pelvic brim. Obliquity of the uterus has been deemed a cause, the force of the child's head being thereby directed mostly against the side of the cervix. Dr. Thomas Keith discovered, when collecting materials for his thesis in 1848, that women pregnant with hydrocephalic children were very liable to a giving way of the uterine parietes during parturition. Of 74 cases, 16 had laceration of the womb. Irregular action of the uterus has produced it during gestation, there being no premonitory symptoms. In such cases some part of the parietes must have been either greatly thinned or softened.

424. Sometimes it is found that a premature degeneration of the muscular fibres of the uterus has led to it—an earlier granular transformation of the fibre cells. Dr. Barnes is of opinion that death of the fœtus *in utero* is occasionally a cause, owing to its losing its natural resiliency and aptitude for being propelled through the pelvis.

An instructive case is reported in the *Lancet*, July, 1866, by Dr. Dalton, where the labor was obstructed by the nature of the presentation—viz., a head and foot. On a *post-mortem* examination, it was found that the laceration was posterior and longitudinal, extending from the cervix to the body. In this case the uterine parietes had become thinned and softened, probably owing to the woman having stumbled while crossing a railway, ten weeks before. At least, a pain over the uterus was set up at that time, and continued till labor. There was scarcely any external bleeding in this case. Some authors have suggested that too large doses of ergot, given when the os is rigid, may conduce to rupture. Denman says that "independently of disease, the uterus may be worn through mechanically in long and severe labor, by pressure and irritation between the head of the child and the projecting bones of a distorted pelvis, especially if there exist a sharp edge."

The duration of the labor was supposed to have something to do with the lesion, but Dr. Trask has shown, in his admirable essay, that many cases occurred where the labor had not exceeded twelve hours.

Seat of Rupture.—It was at one time thought that the cervix was the most common seat, but Dr. Trask has found that of about 120 occurring during labor, one half were of the body and fundus, and the other of the body and cervix, including, in some cases, the vagina. Sometimes the peritoneum is lacerated as well as the uterus; at other times the former has been found torn without any laceration of the womb.

425. **Symptoms.**—These vary a little according to the seat and extent of the rupture; but there is generally intensely acute pain set up immediately, and confined to a particular spot. The pain is of an intolerable and agonizing character, dwarfing even the throes of parturition. The uterine contractions are commonly arrested, and the head, or presenting part, is found to recede, owing to the entrance of part of the fœtus within the peritoneal cavity. There may be hemorrhage externally, but often there is not; bleeding, however, taking place into the cavity of the peritoneum. The pulse becomes weak, rapid, and fluttering, and the respiration hurried. Vomiting occurs, at first of the stomachic contents, then material of a dark-brown color. The countenance betrays the great suffering by pallor, puckering, and pinched features; and collapse sets in rapidly. This collapse may be partly due to the internal hemorrhage; but probably is more owing to the pain, the nervous shock, and the advent of the fœtus into its novel and abnormal locality. When the fœtus has thus migrated from its natural habitat into the fearfully abnormal peritoneal location, its various parts may be made out more distinctly by the hand through the abdominal parietes. Some abdominal emphysema, with crepitation, may be detected at times. Soon after this, if the patient do not succumb to the collapse, a reaction sets in, but it is just the initiation of inflammation. There is an enhancement of the pain; the abdomen gets tympanitic, and extremely tender; the patient lies on the back, with the knees drawn up; the pulse gets still more feeble and rapid, the respiration more hurried and painful; vomiting persists, alternated with hiccough; the extremities become cold; a clammy perspiration breaks out, and the patient gradually sinks and perishes.

426. **Treatment.**—Speedy delivery is demanded, and in the manner least likely to aggravate the terrible shock of the rupture. Version should be performed, if practicable; and if the fœtus has got out of the uterus and into the abdomen, we must introduce the hand carefully through the rent, and, seizing a leg, draw it cautiously down. Care must be taken not to drag down or bruise any portion of gut, if, as sometimes happens, it should be prolapsed. If the head has not receded much, and lies low enough to be grasped, the forceps may be more suitable than turning. After extraction, large doses of opium (gr. I every hour) must be given; it is the sheet-anchor here. If it is under ban in eclampsia, in this melancholy complication it is our chief mainstay and hope. If the woman be saved, it is through opium. If, owing to pelvic distortion, or rigidity of os, or tetanus of the uterus itself, we are unable to turn, or to deliver with the forceps, the only other alternatives are craniotomy and gastrotomy. The forceps is often inapplicable, and embryotomy is frequently practiced; but unless the head be down, and well steadied, much difficulty will attach to the operation. Try and turn always, if at all practicable. Under chloroform there are, nowadays, fewer cases of unconquerable rigidity met with; or, we should rather say, we have a better chance of overcoming the rigidity. Some authors, including W. Hunter and Denman, actually recommended these cases to be left to Nature. Never was a more hopeless task intrusted to her wondrous power. It was thought that the child might ultimately be discharged by abscess,

through the abdominal walls, as happens in extra-uterine pregnancy at times; but no one now thinks of folding his arms and waiting for so doubtful a contingency.

427. The performance of gastrotomy, though a dangerous proceeding, may have to be undertaken; that is, where the lighter alternatives of version, the forceps, and cephalotripsy are quite impracticable; but how cheerless the prospect if the woman is in a state of collapse. If the female were not so very much weakened, and all other operative procedure necessarily debarred, then it might be performed; but we question, were she in a state of profound collapse, whether we ought not to wait and see whether or not, by means of stimuli, some little return of strength might not be secured. Only, there is this again, the risk of peritonitis setting in. Delaying delivery is now generally condemned, for the researches of Dr. Trask have shown that if there is hope at all (and, indeed, that is little in any case), it lies more on the side of early extraction. The treatment of the collapse consists in the administration of moderate quantities of stimulants, ammonia, and wine, taking care not to aggravate reaction by immoderate supplies. Warm bottles should be placed at the extremities. When inflammation begins, two or three dozen leeches should be applied to the abdomen, and the opium continued every hour. Hot poultices over the abdomen are also useful.

An interesting case is reported by Dr. Crighton of Chapel-en-le-Frith in the Edin. *Med. Jour.*, August, 1864. The doctor performed gastrotomy, and the patient recovered slowly. Fourteen hours elapsed between the time of rupture and that of the performance of the operation. This woman had a contracted pelvic brim. Another case is reported by Dr. John Moir of this city, in the same journal for October, 1865. This was a traumatic one, the woman having been struck on the right side of the uterus by the shaft of a cart. On receiving the injury she almost fainted, and was carried home, profuse hemorrhage appearing externally. An opiate was given by the doctor who first saw her, and hot fomentations enjoined. This treatment was continued for fully twenty-four hours, and it was not till nearly thirty hours had elapsed after the receipt of the injury that Dr. Moir was summoned. After consultation, Dr. Moir performed gastrotomy. On opening the abdomen, a large tin basinful of clots and bloody serum escaped. The child was seized by the thighs and removed, the abdomen carefully sponged, and the wound closed with wire sutures. She died thirty hours after the operation, with all the symptoms of peritonitis. There was no *post-mortem* permitted by the friends.

Dr. Moir thinks that this woman might have had a better chance had the operation been undertaken earlier. Not a few men of experience are rather in favor of gastrotomy in these cases, as a rule. They are of opinion that it offers a better chance, on the whole, than turning, because we are enabled to adjust the uterine wound properly; and not only that, but we clear out the clots from the peritoneal cavity, and thus avoid an almost certain cause of fatal inflammation.

428. **Laceration of the Vagina.**—This lesion is by no means uncommon, and, doubtless, when not very extensive, is often overlooked, owing to its not setting up any marked symptoms. The lacerations, or tears, may be transverse or longitudinal. They result from the overstretching of the vagina by the child's head; by pressure of the same; or by the rude use of the forceps. The rents which occur with those of the cervix are usually longitudinal, and are frequently deep. A deep laceration,

leading to sloughing in the anterior wall, occasions a vesico-vaginal fistula.

Symptoms.—When the lacerations are slight, little uneasiness is occasioned, but when more extensive, a high degree of fever is set up. A feeling is prevalent now that many cases of puerperal fever, hitherto unexplained, may have been due to such lacerations.

Lacerations of the Vulva, etc.—The vulva is a common seat of lacerations, and, like those of the vagina, have often been overlooked; but this is generally of small moment, as they rarely beget serious symptoms. The rents are usually small; but sometimes large portions of mucous membrane are torn off, and hang loose. This may happen without any breach of the perinæum, even the fourchette remaining intact. That such lacerations should occur, while the perinæum escapes, is a proof that the latter has less anatomical connection with the orifice of the vagina than is usually supposed.

429. **Lacerations of the Mucous Membrane,** betwixt the clitoris and the urethra, are of considerable gravity, owing to the vascularity of the part. From the cavernous tissue of this part profuse hemorrhage may spring. We have pointed out, in a paper in the Trans. of the Edin. Obstet. Soc., vol. iv. p. 279, that this bleeding may be mistaken for that flowing from the uterus, and, doubtless, in former times misled even men of much experience.

Treatment.—The lacerations of the vagina, vulva, etc., require little treatment beyond the application of cold water or ice, and keeping the parts clean. They usually heal by suppuration. If bleeding continues to a considerable extent, compression. or a styptic, such as perchloride of iron (liquor) may be necessary. Some vessels may even require to be ligatured.

CHAPTER XLV.

LACERATION OF THE PERINÆUM.

430. This is an accident that will happen under the ablest auspices at times. It is most common in primiparæ. When of limited extent, it is of little concern, but if extensive, it may cause much future annoyance, by giving rise to cicatrices which may impair its elastic character, and thus impede labor. Beside, if extensive, and not again properly united, it may favor prolapsus uteri. This, we may state in passing, is denied by some authors, but we believe that it is true. At a meeting of the Edinburgh Obstetrical Society, Dr. Matthews Duncan read a paper wherein he made very light of the perinæum in its relation to uterine prolapse. At the next meeting, we had the honor of advocating the opposite view, maintaining the value of the perinæum as at least an indirect prop to the uterus, though not one of its chief supports. Those who wish to hear at length what may be advanced on both sides will find Dr. Duncan's paper in the Edin. Med. Jour. for Feburary, 1871, and the author's in the same Journal for that year. But we must apologize for this digression.

Varieties of Ruptured Perinœum.—These are four, viz.:

1. Where the perinæum is torn from the fourchette to the sphincter ani.
2. Where the laceration takes place between the constrictor vaginæ and sphincter ani, those muscles not being involved.
3. Rupture extending the whole length of the perinæum, dividing the sphincter ani and recto-vaginal septum.
4. Entire length as in No. 3, but anterior portion untorn.

The child has sometimes passed through a perforation such as No. 2, and also through the aperture as in No. 4, the anterior margin remaining entire.

431. **Causes of Ruptured Perinæum.**—The causes named are numerous. (1.) Want of natural curvature of sacrum, the child consequently being driven downward upon the posterior part of the perinæum, instead of forward in the direction of the axis of the pelvic outlet. (2.) Preternatural force of uterine contractions, causing the expulsion of the fœtus before it can be adapted to the pelvic curve. (3.) Undue acuteness of the pubic arch, preventing the presenting portion from being received within the gap, and thus leading to immense distension of the perinæum. (4.) Rigidity of perinæum, whether from undue tenseness of fibre or cicatricial tissue. (5.) Unusual breadth of perinæum. Here the head rests and presses more on it, instead of being carried forward. (6.) Mal-positions and mal-presentations. A hand coming down with the head has caused it. A foot has sometimes been forced through it. The breech does not receive the proper forward direction so well as the head. (7.) Exostosis of the pelvis may impel the presenting part down upon it. (8.) Unruptured and very tough hymen. The latter has been known to resist longer than the perinæum. (9.) Too strong voluntary effort on the part of the woman. (10.) Reckless use of instruments. (11.) Preternatural enlargement of fœtal head, as in hydrocephalus. (12.) Awkward manipulation in supporting the perinæum.

Mr. Baker Brown, in his excellent work, Surgical Diseases of Women, says that 31 cases out of 81 of ruptured perinæum which came under his care were due to the use of instruments. In some cases the forceps excited such violent pains that forceps and child together were rapidly expelled. Surely no chloroform had been employed.

Consequences.—These depend on its extent. When slight, there may be no inconvenience; but when the sphincter ani and recto-vaginal septum are torn through, there will be distressing results. The fæces may for a time invade the vagina, causing irritation and an offensive odor. When the fæces are hardened, this is not so likely to happen. Dragging pains are experienced, and the woman will have difficulty in going up or down a stair or incline. Troublesome leucorrhœa may be experienced too. As the perinæum antagonizes the diaphragm, its rupture removes one of the supports of the pelvic and abdominal viscera, and these may gravitate to a certain extent. The rectum prolapses; so does the vagina and bladder; and as these are all connected with the uterus, they tend to pull it down with them. We are bound to add, however, that many women have gone about with an extensive rupture without suffering much inconvenience. Nature is full of resources; the parts become hypertrophied, and even when the sphincter ani is not healed, the fæces are retained. In some cases, where fæces cannot go, however, offensive gas travels, and thus the unfortunate woman exhales a forbidden odor, which compels retirement.

432. *Treatment.*—The treatment of this laceration is thwarted by numerous obstacles. These are as follows: (1.) Irritation of lochial discharge. (2.) Tendency to inflammation and sloughing in some constitutions. (3.) Retraction of the parts, occasioned by the contraction of the muscles. (4.) Further separation of parts by movements of female. (5.) Greater tendency to growth of mucous membrane than to healing by first intention or by granulation, (6.) Interference with healing process by rectal and vesical evacuation. (7.) In some cases, lapse of time, leading to hypertrophy and induration of parts.

Such are the chief impediments to the cure of perinæal rupture. By many practitioners, we may observe, there is no great lamentation over these; they are not much concerned whether it heals or not, that is, provided the vagina and rectum are not thrown into one. Some even joke, and say that it it is better if union does not take place, for then there will be a more ample outlet for the child, should the woman again become pregnant. But to the treatment. In many cases union takes place simply by keeping the parts clean and in contact. For the latter purpose, pass a binder round the thighs. The bowels should be opened early, and then closed for a week. An opiate will do this. The water may be drawn off with the catheter. The more extensive rupture can hardly be expected thus easily to unite, therefore various operations are resorted to.

Dieffenbach, some forty years ago, after investigating the subject, laid down the following rules in connection therewith: (1.) Prior to the operation, the bowels should be well evacuated. (2.) Operation to be performed as soon as possible after the accident, as suppuration and sloughing are more likely if it is delayed. (3.) No rupture, however slight, should be left to nature, for the healing would be superficial, and the vulva enlarged proportionably to the extent of the laceration, by the retraction of the labia toward the anus, the support of the pelvic viscera being thereby also diminished. (4.) That three to five sutures are necessary, according to the extent of the tear, the insertion beginning at the anus, and, where the sphincter is torn, the first being applied at its angle. (5.) That in lax perinæum, the twisted or the interrupted suture may be used; and when the vagina is implicated, its fissure should be first brought together; also, that where the perinæum is rigid, an elliptic incision should be made on either side of the median line, and equi-distant from it. (6.) Where there has been much loss of substance, transplantation of adjoining integument may be had recourse to. (7.) In old-standing cases, the edges of the wound must be pared. After operation, the bowels must be constipated by opium.

433. These are excellent rules, many of them, and have contributed much to success. Many other operations have been suggested by German and French surgeons. The Germans employ the interrupted suture, and the twisted suture as an adjuvant, to prevent inversion or eversion, and thus maintain apposition of parts. Some employ long curved needles, three to four inches long, transfixing the whole thickness of the lips of the wound. The method of the distinguished surgeon, Langenbeck, of Berlin, embraced the following stages: (1.) Section of the free border of the recto-vaginal septum. (2.) Splitting of the septum, and the formation of a flap intended to form, in the new perinæum, the anterior side of the triangular space formed by the two canals, the vagina and rectum, with the perinæum as the base. (3.) Paring of the edges of the

laceration. (4.) Insertion of sutures. (5.) Dieffenbachian semi-lunar incisions to relieve tension.

The patient rests after the operation on a water-cushion, and the part is dressed by compresses dipped in water.

Mr. Baker Brown has been a very successful operator, and we shall conclude by noticing his method.

When the laceration extends to only about an inch, Mr. Brown believes that rest, cleanliness, and keeping the legs close is sufficient. In that form, consisting of a perforation, that is, where anteriorly and posteriorly the parts are unruptured, it is necessary to divide the anterior band at the fourchette, and then bring the edges together by quill and interrupted sutures. If it has existed for some time, the edges must be pared.

In the form extending to, but not involving the sphincter ani, he believes operative interference necessary; for although the functions of the rectum are not interfered with, yet the vulva remaining abnormally large in many instances, dragging down discomfort is occasioned; and, worse still, there may be gradually produced either a rectocele, or cystocele, or both, with ultimate uterine prolapse. Undoubtedly, many of these cases, as most experienced practitioners have observed, heal up without operation, but often the process is badly done; adhesion is superficial, and the contraction attendant on granulation draws the parts toward the anus, thus enlarging the vulva again. The remaining severe form, of course, demands careful and skillful operative treatment also.

434. **When is Operative Interference Contra-indicated ?**—Mr. Brown says that we are not to operate if the woman is pregnant and has gone on to the 4th month, and inflammation and suppuration are present. He waits, in the case of suppuration, until after delivery, and in the case of inflammation, until this subsides. He does not share the fears of those who think that operating will induce abortion. He thinks, on the contrary, that wounds in this region heal more rapidly during pregnancy than at any other time. Leucorrhœa is not a bar to operating, but the menstrual discharge is. We must wait until the flow has ceased for a day or two. Cough interferes much, and ought to be cured first, if practicable. Anæmia and general debility, or other morbid state impairing health, are unfavorable, and ought first to be amended, As in anæmia and tuberculosis, we find the operation for fistula in ano often unsuccessful, so here union may be thwarted.

Time of Operating.—The operation should be performed immediately after the completion of labor. The surfaces of the wound are then in a condition more favorable to union by the first intention, and paring is thus not needed. If this most favorable time is allowed to slip away, then vivisection of the edges will be required.

Method of Operating (Brown).—Place patient on back, with knees well bent back on abdomen, and shave off any hair that may be in the way. The sides of the fissure being held by an assistant, so as to make them tense, a clean incision is then made about half an inch external to the edges of the fissure, of equal length to it, and sufficiently deep to reflect inward the mucous membrane, and to completely bare the surface as far as another incision carried along the inner margin. The denudation of the opposite side of the rent or laceration is conducted in the same manner; and the mucous membrane, from any intermediate portion of the recto-vaginal septum, is to be also pared away. Great pains must be taken with this denuding process, for the least bit of mucous membrane left will maintain a fistulous opening when the rest of the surfaces have united. The knife denudes more neatly and thoroughly than the scissors.

435. *Division of the Sphincter Ani.*—Mr. Brown lays much stress on this, his own plan. So soon as the state of denudation and paring is completed, he divides the sphincter on both sides, about a quarter of an inch in front of its attachment to the os coccygis, by an incision carried outward and backward. A blunt-pointed straight bistoury is introduced within the margin of the anus, guided by the forefinger of the left hand; it is then carried quickly and firmly through the skin and sub-cutaneous areolar tissue to the extent of an inch, or even two, external to the anal orifice, through some of the fibres of the muscle which immediately surround the anal orifice, but leaving those more deeply seated within it untouched.

Insertion of the Quill Sutures.—After division of the sphincter, the thighs are to be brought together, and the quill sutures introduced. The left denuded surface, and the tissues external to it, being firmly grasped between the forefinger and thumb of the left hand, a strong needle, carrying a double thread, is plunged with the right hand through the skin and subjacent tissue, an inch external to the denuded surface, and thrust downward and inward beneath it, until its point re-appears on the edge of that surface; it is then introduced at the corresponding margin of the denuded space of the opposite side, and made to traverse beneath it in a direction upward and outward, until it escapes at a point equi-distant from the external margin with that at which it entered on the left side. Each suture is to be introduced in the same way, the one nearest the rectum first. Two often suffice, but three are at times required. The sutures are double, to allow them to inclose the quills (or the pieces of bougie which are often employed), around which they loop on one side, and are tied over by their free ends on the other. Mr. Brown prefers stout twine, well waxed, for the quill sutures.

436. *The Interrupted Sutures.*—When the quill sutures are firmly secured, the sides of the laceration are thereby approximated—the denuded surfaces in apposition. Then, to bring together the outer margins along the line of the skin, three or four interrupted sutures (of silver wire) are passed. This is better than the twisted suture. Previously to bringing the operation to a close, the forefinger of the right hand should be passed into the vagina, and that of the left into the rectum, so as to find out whether the parts are in complete apposition.

When the parts have been well cleansed by sponging with cold water, a piece of lint steeped in cold water is applied, and over it a napkin, kept in position by a T bandage.

It would be advantageous to cover the wound with some carbolic plaster and gauze.

After-Treatment.—Place the patient on her left side on a water-cushion, after the operation, with the thighs and knees close together, and flexed on the abdomen. Perfect quiet is maintained. A little ice by the mouth allays nausea and tendency to fever. One grain of opium is given at once, and repeated every six hours for the first twenty-four hours, and afterward one grain night and morning. Diet, at first, beef-tea and farinaceous articles. A little port wine may be given the following day if the woman is feeble. After the third day, a generous and restorative diet is allowed, provided there be no febrile symptoms. The urine should be drawn off by a catheter three times in the twenty-four hours. On using the catheter, take care to prevent dribbling of urine on the wound. After eight days, the woman may, as a rule, be allowed to pass water, resting on the hands and knees. The deep sutures are to be removed on the second or third day: in about fifty-four hours is the best time. If they are longer kept in, suppuration, and mayhap sloughing, is favored. On the sixth or seventh day the interrupted sutures may be removed. When the quill sutures are removed, care is taken not to separate the thighs, for it is necessary to keep up their apposition for some time. If there is much bleeding, ice may be applied. Under the Listerian system, offensive discharges are now less likely, so the disinfectant lotions formerly in vogue are superseded. When union is complete, care should be taken not to open the bowels in a Hamiltonian way. Gentle laxatives, such as a small dose of castor oil, with enemata of warm water, are best. During the first evacuation, the perinæum should be supported. If sinuses exist, caustic, tinct. iodi., or acetum cantharides may be applied.

CHAPTER XLVI.

VESICO-VAGINAL FISTULA.

437. This consists of a perforation or opening between the vagina and bladder. The bladder thus communicates with the vagina, and may pour more or less of its irritating excretion, the urine, into this canal, giving rise to much distressing irritation. At one time this accident was deemed, like cancer, one of the opprobrious, incurable surgical ailments; but for a number of years (some twenty) back, thanks to Marion Sims, Bozeman, and others, it has attained the platform of a curable disorder. Not that surgeons are yet invariably successful, but only that failures are now less frequent. The improvement of this operation by our American brethren is one of the surgical glories of the young country, and, with many others, such as the application of ether, etc., reminds us that they emulate, and frequently eclipse, us in discoveries calculated to relieve suffering humanity.

Causes.—(1.) Prolonged labor—second stage—with impaction of the child in the pelvis. This leads to inflammation, ulceration, and sloughing. In a female ward of the Royal Infirmary, on making inquiries some winters ago, we found that in every case that year the women who suffered from the accident had been upward of twenty-four hours in labor, and some of them two or three days. They were chiefly from the country, and had been attended by midwives. (2.) Employment of instruments recklessly, and without previous evacuation of the bladder. The great importance of emptying the bladder before delivery, by means of the catheter, cannot be too often or strongly impressed on the junior. (3.) The fistula has been caused by criminal attempts to induce abortion. (4.) A calculus in the bladder during delivery, leading to crushing of the parts between the fœtal head and the stone, has been known to occasion it. (5.) Long retention of a hard pessary in the vagina. (6.) Malignant disease of the uterus and vagina sometimes eats its way through, and the same with corroding ulcer. (7.) Sir James Simpson (Obstet. Works,

p. 232) published cases where a pelvic abscess occasioned it by opening into the bladder.

By far the most common cause is the delay in labor. Next, perhaps, the use of the forceps with an impacted rectum, and overflowing bladder.

438. **Symptoms.**—Involuntary dribbling away of the urine by the vagina, with excoriation of the latter, and of the external parts and thighs. Sometimes crystals form around the fistulous aperture. There is a disagreeable urinary odor, and, of course, the woman is obliged to isolate herself on this account, and owing to the constant wetting. The frequency with which the urine drains away depends on the site of the opening. If it be situated at the neck of the bladder, the discharge will be unceasing; it will be at intervals when the aperture is placed further back. Diagnosis may be confirmed by an examination, thus: Pass a probe or catheter into the bladder, then introduce the forefinger of the left hand into the vagina. If there be an opening, by thus manipulating, the finger will come in contact with the probe. If the woman be placed on her hands and knees, and the walls of the vagina separated by a retractor or a duck-bill speculum, the fistulous opening may be seen as well as felt. In this position, too, the vaginal canal opens up wondrously when the entrance of air is permitted. Marion Sims first pointed out the value of this position. If the opening cannot in either of these ways be detected, being situated, perhaps, between the bladder and cervical canal, then a little tinct. cochineal may be injected into the bladder, when it will be noticed to trickle from the uterus.

Treatment.—There are some cases very unfavorable even for the most skilful treatment. The extent of the opening, its character and situation, have not a little to do with success or the reverse. When there is much loss of substance there is little chance of success. Sometimes there is not material to close with. If far back, and imperfectly reached, one may fail also. We have known women operated on half a dozen times without a closure being effected. An opening of irregular shape is not so favorable to success. We shall notice briefly a few of the different methods which have been adopted from time to time, and, lastly, the plan now usually followed.

439. (1.) *Cauterization.*—The frequent application of nitrate of silver has been tried, but without much benefit. The same is true of nitric acid.

(2.) *The Actual Cautery.*—This has cured in some cases where the opening was small. Dupuytren, who first suggested this method, succeeded in several instances. Delpech had favorable results too, and Dr. Kennedy and others. In a single case, we obtained a cure by this means.

(3.) *Plan of Dessault.*—This consists in plugging the vagina, and keeping a catheter in the bladder, so as thereby to prevent the urine from coming by the abnormal channel of the vagina. Some cases have been thus cured. There is a better prospect of a good result if the aperture is small, and not situated too far back. The Dessaultian method is certainly based on a sound principle. What is it that mainly hinders a closing of the opening? The urine is the great bar. Well, keep it away from this opening, favor its exit by the natural passage, and you attain half the cure. Nature—exceedingly potent—when the obstacle of acrid urine is not thrown in her way, repairs wondrously. If complete union does not take place, there is sometimes a thickening of the edges and mechanical closure. Complete organic junction, however, has rarely been secured in this way. There is one drawback to this method, viz., intolerance of the catheter in some cases. This we have witnessed frequently. You will find some females who will tolerate this foreign body in their urethra uncommonly well; others, again (and the same is true of males), are extremely irritated, and experience rigors or febrile symptoms by its presence.

Incision.—Some cases have done well after being laid open, as in a rectal fistula. It is only slight ones at the neck of the bladder that will answer thus. Blundell laid one (at the neck of the bladder) open into the urethra, and it did well. We cannot look for many cures by this method.

440. (4.) *The Sutural Method.*—Roonhuysen was the first to practice this plan, and it was also carried out by numerous other surgeons. The original method, however, was by the use of twine or silk. This checked union by promoting pus. By and by came metal. Metal has proved a perfect Godsend. To whom are we indebted for it? Mr. Gossett, of London, undoubtedly employed metallic (gold) wire, in 1834, for sutures in this operation; but his example was not followed in this country. This was, perhaps, owing partly to the fact that he did not "push" the method sufficiently; for it must be confessed that even a real, and true, and useful invention often requires much persistent laudation to insure its adoption, so conservative is the professional mind. A little caution is all very proper. The lustre, then (Mr. Gossett's metallic wire not being adopted), of metallic sutures belongs to the far West. It was Marion Sims who wafted their value abroad. Dr. Sims, in fact, by his speculum also, and other appliances for this accident, made quite a great and worthy reputation. Dr. Bozeman, of Alabama, is also entitled to renown in connection with this matter. He introduced many improvements of various value. Mr. Baker Brown and Sir James Simpson still further added to the means whereby the operation might be performed with less difficulty, and with increased success.

441. *Sims' Invention.*—This was the silver-wire (annealed) sutures. The wire is very fine; and Dr. Sims used at first clamps, or cross-bars of lead or silver. The great advantage of the silver lay in this, that it did not ulcerate out. Then there is his highly useful duck-bill speculum. Dr. Sims, before introducing the wire, transfixed the parts to be brought together at as many points as were required by means of a long, spear-pointed needle, armed with silk thread, the ends of which were left free to serve as guides for the metallic sutures. He then fixed the wire sutures, by means of a clamp, on each side of the united edges, and by split-shot fastened on each ligature. Dr. Sims now discards the clamps, and simply twists the ends of the suture together.

Dr. Bozeman's Invention.—Dr. Bozeman invented the button-shield, an oval plate of silver, of form and dimension adapted to the fistulous aperture, and about the thickness of card-board. It is perforated along the centre with a row of holes to admit of the sutures, the two ends of the ligatures going through one hole. When the sutures are inserted, this shield is pressed down to the fistula, and the wires are then drawn tight, and retained by split-shot, or other means. His bent knives, forceps, etc., are also very ingenious. The button-shield seemed to answer well, many complete cures being effected by it, both by the inventor and others.

Sir James Simpson discarded this, and latterly employed the silver or iron wire by itself, twisting the ends by the little instrument now so well known. His long, curved, hollow needle, through which the wire passes so as to be introduced, is not more ingenious than useful.

Method of Operating.—Some preliminaries are necessary in many cases. If there are cicatrices in the vagina, they should be divided first. A straight bistoury is used, and the cuts are to be made toward the sides of the vagina. Arrest the bleeding by ice or strips of lint dipped in oil. After the removal of this, in forty-eight hours, a tent of compressed sponge is placed in the vagina, so as to dilate it. When the incisions are healed, and the whole vaginal surface covered by mucous membrane again, the operation is to be begun. In many cases this previous treatment is not required. Any salts from the urine, hanging like little needles around the fistulous aperture, are to be flooded away by injections. The operation should not be performed during lactation or menstruation. A week after this latter flow is the time. As in the case of other operations about the pelvis, the bowels are to be evacuated first.

442. The patient is usually placed either in the lithotomy position, or in that suggested by Marion Sims—the semi-prone posture. Dr. Bozeman adopts that on the hands and knees, and this is best in some cases, as giving a better view of the lesion; but then it debars the use of chloroform. An assistant widens out the vagina with Sims' speculum, or with retractors; and the surgeon, on getting a view (if possible) of the opening, seizes hold of the vaginal septum with a vulsellum. This is given to an assistant to hold; then the operator maps out by incision the extent of the mucous membrane around the opening which he means to remove, making his cut (as in cancer of the mamma) on the lower side first, so as to prevent the blood from covering and obscuring the aperture. By a long curved knife this ring of mucous membrane is then pared off—sometimes in a single piece. Some cut away the mucous membrane by means of scissors. Sometimes we will make the septum tight and get a better point of resistance when cutting, by introducing a piece of cord through the bladder, and bringing it out at the opening, then having the assistant to hold it tight. When the edges are pared, the sutures are introduced by the long perforated needle. This needle is made of different curves, to suit different cases. From three to five or six sutures may be required, and after introducing them, they are tightened by twisting their ends. The sutures should be kept in for a good while—eight or ten days. The after-treatment is the same as in ruptured perinæum. The patient gets a good opiate, and a catheter is introduced into the bladder. This should have a curve, so that the extremity within the bladder should point upward toward the pubis, and an elastic tube and bag should be attached to its external end, to collect the urine and prevent wetting of the clothes. A mild laxative may be given the ninth day, with an enema of warm water.

443. In cases where the fistula embraces the uterus also, and the os forms one side of the opening, the surface of the latter must also be denuded, and the sutures passed through it, so as to unite it with the wall of the bladder. For this purpose the womb is prolapsed a little by means of the vulsellum.

When the opening is in some part of the cervix, and not far above the os, this latter is slit up to the aperture. Then the cut edges are bound by suture to the bladder, as before.

When the fistula is still higher, and this method cannot be practiced, it is sometimes necessary to occlude the os, and let the menses go *viâ* the bladder. Better have bloody urine (the hæmaturia, mark, neither renal nor vesical) once a month than a continuous or oft-repeated flow of irritating urine by the uterus and vagina, keeping the hapless female in isolation, discomfort, and misery.

Plastic Plan.—When there has been great loss of substance, a portion of integument has been transplanted to the fissure. Velpeau suggested this plan, but here the plastic operation has not been attended with success.

Causes of Non-success.—In numerous cases, even after the operation has been carefully performed, a complete closure is not achieved. One cause of failure is the leaving of a portion of mucous membrane during the paring of the part around the fissure. Another may be the not taking a deep enough hold of the tissues in passing the needles. Failure may also arise from a cartilaginous condition of the edge of the wound, from debility of the patient, or from neglecting to attend to the bladder, and to the maintenance of constipation for some time.

CHAPTER XLVII.

PARTURITION.—CLASS III. COMPLEX LABOR.—ORDER VI. INVERSION OF THE UTERUS.

444. This is a rare accident or complication (out of 100,000 deliveries in the Dublin Lying-in Hospital, there was only a single case of acute inversion, according to Dr. Denham, Dublin Quart. Jour. Med. Science, 1866), and fortunate is it that it does not occur often, for it is a very critical one. It involves a turning of the uterus inside out like a pocket, the internal surface becoming external. The fundus traverses the cavity of the uterus, just as the head of the fœtus would do, descending also through the os, and forming a cavity lined by peritoneum, open toward the abdomen. Thus the mucous coat of the uterus is external, while its external or peritoneal coat becomes internal. The inversion may take place to a greater or smaller extent. There may simply be a little depression of the fundus (in which case there will be a great chance of the body of the uterus forcing it further down), of partial inversion, or complete. In partial cases, the fundus is brought down into the vagina, forming a hemispherical tumor closely invested by the os. The depression of the fundus may be felt through the abdominal wall. When the inversion is complete, the uterus descends beyond the vagina, and may be felt protruding. In this latter case the os may be detected as a thickened circular band at the apex of the tumor; and we fail, of course, to detect the uterus through the abdominal parieties.

445. **Time of its Occurrence.**—Some authors believe that inversion may occur in the virgin uterus, even when that is innocent of any tumor or other contained body; but, if this be true, it is no less certain that such cases are exceedingly rare, and that it usually happens to the parturient uterus, or where this organ is the seat of polypus or other tumor. Cases are recorded where it has occurred during abortion, but by far the greater number have taken place immediately after delivery. It occurs sometimes after the death of the female, owing to posthumous contraction of the uterus. It has happened many hours after labor, from the

violence of the after-pains. Cases are reported as early as the 5th month, but usually there is the complication of a tumor.

Method of Production.—There is no great unanimity of opinion respecting the method of production of this accident. A very prevalent view is, that it is occasioned by a reckless management of the third or placental stage; by pulling forcibly at the funis, and that, too, when the uterus is not assisting, and consequently relaxed. Now, while this may be true, so far as some instances are concerned, we know quite well that it has often occurred without this form of mechanical traction, or, indeed, any other. Its spontaneous production must be fully conceded. A short cord has sometimes caused traction sufficient to induce it, and the same is true of the weight of the child, when it has been born while the mother was in the upright position. Some cases are reported where, when the hand of the accoucheur has been inserted for the purpose of detaching an adherent placenta from the fundus, the uterus has been excited to such intense action that inversion has been produced.

446. Dr. Tyler Smith believes that inversion cannot take place when the uterus is passive; there must be an active condition of that organ. The following is his description of the process of inversion—the steps by which it is effected (Manual of Obstet., p. 481): "There is," says he, "first cup-like depression of the fundus. Coincident with, or immediately following upon, this depression, there is hour-glass contraction of the body or lower portion of the uterus. The annular contraction of the body of the uterus grasps the intro-cedent fundus as it would a foreign body, and carries it downward for expulsion through the os, the os itself being at this time either in a state of inertia, or actively dilated, just as at the end of the second stage of labor. After the inverted uterus has passed through the dilated os, this part of the organ becomes contracted, preventing re-inversion (reponement) from taking place. There is, first. then, depression of the fundus, with annular or hour-glass contraction of the body of the uterus, and dilatation of the os. Next, there is intussusception of the fundus by the body of the womb. Lastly, complete inversion, with contraction of the os upon the inverted organ." According to this theory, the uterus itself is the chief factor in its own misplacement; and its inversion cannot altogether be laid to the door of the foolhardy accoucheur.

447. Matthews Duncan has devoted one of his able papers to this question, and propounds the following original theory: Conceding that the complication is most prevalent in hands unskilled, he believes that mechanical interferences, such as pulling at the funis, when the uterus is in a state of general relaxation, may inaugurate the thing, or produce the first stage; but the remaining part must be completed by uterine action. Dr. Duncan divides uterine inversion after delivery into four kinds: (1.) Spontaneous passive uterine inversion. (2.) Artificial passive uterine inversion. (3.) Spontaneous active uterine inversion. (4.) Artificial active uterine inversion. The only uterine condition, he says, essential to the production of all these is paralysis, or inertia, or complete inaction. This is the state of the entire organ at the time of production of the first two. In the two last it is accompanied by uterine activity of another part of the uterus; that is to say, we have one part paralyzed, inert, and incapable of action, and another sound and active. We have an example in hour-glass or annular contraction. Here the narrow or constricted part is active, while above this there is inertia. When the upper part is paralyzed, and the lower active, and

the former gravitates a little, or is made to descend a little by down-bearing (or owing to the state of the retentive power of the abdomen), then we have the conditions leading to inversion (spontaneous active). The paralyzed and inert part is seized by the contiguous contracting segments, and borne down through the os, and beyond the vagina. Rokitansky, Hegar, Desormeaux, and others have pointed out this local inertia as productive of hour-glass contraction, but none of them indicated that it might be concerned in the causation of inversion.

Diagnosis.—One could hardly mistake a complete case of inversion, but the more limited variety might not be so readily detected. It might be mistaken for polypus. Dr. M'Clintock published a case (Dublin *Quarterly Journal.* Feb., 1859), where there was some difficulty at first in making it out. The tumor had no rough surface (that of inversion usually has); but at no part could a bougie be passed into the cavity of the uterus. Then, when the tumor was drawn down, all appearance of cervex and os was obliterated. In these incomplete cases, then, on inserting the finger within the os, we feel a rough and bleeding surface, and the tumor (fundus) would be sensible. On manipulating over the abdomen, we might detect the cup-like depression. A case of complete inversion resembles uterine procidentia a little, but is easily distinguished from it. In inversion there is hemorrhage, and the os is absent inferiorly.

448. **Symptoms.**—The symptoms of an acute case (for the uterus is sometimes not returned, and then it becomes chronic) are, great exhaustion setting in immediately, sinking, pallor of countenance, weak, rapid, and fluttering pulse. There is profuse hemorrhage in many cases; but these other symptoms would seem to be independent of the flooding. When the inversion is complete, the bleeding is restrained by the tight girdle of the os above. The nervous system receives a severe shock, for death has sometimes happened shortly after the accident, and without much hemorrhage. There is a case reported in the Edin. *Med. Jour.* for Sept., 1866, where the woman died an hour after the occurrence of inversion. She had lost a good deal of blood before Dr. Manford's (of Inverness) arrival, but little after he detached the placenta, which was attached to the fundus. In this case the midwife, who was in attendance, acknowledged to Dr. Manford that she had made pretty strong traction on the funis. We should think that this female died partly from flooding, and partly from the severe shock. There is an instructive case reported by Dr. Denham in the Dublin *Quart. Jour. Med. Science* for the latter part of 1866. Little traction was made at the funis, but the uterus was expelled from the vagina with the placenta attached, as usually happens. Here the pallid countenance, the feeble and rapid pulse, the anxious aspect, the pain, and the sense of sinking, were well marked. The placenta was readily separated without hemorrhage, and the uterus quickly returned, the patient doing well.

We have encountered this formidable complication but seldom. We saw a case with Dr. Millburn, where by steady upward pressure we were soon able to replace it. The strangulation of the womb by its own os and cervix is doubtless a cause of the severity of the symptoms.

Other signs of inversion are the detection of the elastic tumor, rough, and with a bleeding surface, with its upper part tightly engirdled. In many cases the placenta is still attached.

449. **Symptoms of Chronic Inversion.**—Chronic cases may result from non-rectified acute ones, or be the consequence of a gradual dis-

placement, as happens sometimes where there are uterine growths, such as polypi. Chronic inversion has lasted in some instances for from ten to twenty, or even thirty years. There is commonly recurring hemorrhages, alternated with discharges of mucus. The blood may be seen flowing from the roughened surface every month. Dragging pains are experienced, and a feeling of much discomfort. The patient usually becomes anæmic, and often œdematous about the lower extremities; and she finds it difficult, if not impossible, to walk. Some have died from distention and inflammation of the bladder, others from sloughing, and even gangrene of the uterus. Inversion of the uterus has been mistaken for polypus, and there are various resemblances between them; but in inversion you cannot pass the finger or the sound beyond the pedicle of the tumor, whereas in the case of a polypus you may pass the sound up and within the womb. A combined examination, with the finger into rectum, and the sound into the bladder (Arnott), enables us to find out whether the uterus be in its normal site or not, and thus to confirm or otherwise our suspicion of inversion. The tumor (of inversion) as before said, is usually sensible, and rougher on its surface than that of polypus. The uterus has been removed by incision, in the belief that it was a polypoid tumor. In chronic cases the tumor has been often found to shrink considerably, and it loses its red color, becoming dark-brown.

Treatment of Inversion.—When inversion is acute, and has just newly happened, replacement is commonly not difficult. You place the patient on her back, with the pelvis elevated a little, and then the bladder, if necessary, may be evacuated. No time is to be lost, because the contraction of the os uteri may conduce to the enlargement of the tumor, by arresting the circulation. If the placenta still adheres, detach it with the fingers. The uterus is then to be grasped, and its size reduced as much as practicable by pressure; after which we make steady upward force on until it is replaced. After it is pushed up some way through the os, the uterus assists our efforts, and it is frequently suddenly reponed with a jerk, accompained by a report. We should mention that (contrary to the advice of Puzos) some recommend reduction without previous placental detachment. This we think objectionable. It is obvious that the more we reduce the bulk of the tumor, the better chance will we have of speedy reponement. Some recommend the hand to be left *in utero* for some time after replacement of the tumor; but we would be afraid of exciting violent, and it might be, irregular uterine contraction by such a course, the result mayhap being a reoccurrence of the complication. At least, we should not keep it very long in, unless the patient were thoroughly well anæsthetized. When the uterus is seriously constricted by the cervix, it has been proposed to divide the circular muscular band with a bistoury. If we found it impossible to reduce without this, we would not hesitate to do it.

450. **Reduction of Chronic Inversion.**—We have now a brilliant page of wonderous success under this head. Chronic inversion—that is, the treatment of it—is no longer an opprobrium, any more than ovarian disease, thanks in part to anæsthesia.

Since Valentin, in 1847, reduced one a year old, the tide of success has flowed, and there are numerous instances reported, casting this one fairly into the shade. Dr. Tyler Smith's case is one of the most remarkable (see Medico-Chirurg. Trans., vol. xlii., p. 183.) This one was of twelve years' duration. Dr. Smith operated in the following manner: He compressed the tumor with the fingers for ten minutes, morning and evening. After several days' manipulation, the cervix, which before the operative procedure began was extremely tight, soon relaxed a little, and the tumor could be forced slightly into the os. After each operation a large india-rubber air pessary was introduced into the vagina, and distended as far as the patient could bear. This pessary was, as a rule, worn day and night. "After more than a week of these proceedings, the patient felt a good deal of pain throughout the whole of one night, and on the following morning, when an examination was made, it was found that complete re-inversion had taken place." Dr. Abbie Taylor records one in the American Jour. of Obstetrics (July, 1878) of eleven years' duration, reduced by the repeated application of Braun's Colpeurynter.

Dr. Worster of New York (see American *Jour. Med. Sc.*, Oct., 1867) reduced one of four years' standing. The doctor, after placing the woman under chloroform, made firm compression on the tumor with the greased hand, and strong pressure upward in the proper axis. At the same time, firm counter-presure was made with the thumb and fingers of the right hand, through the abdominal walls, from above and behind the pubis, downward into the centre of the depressed fundus and cervix, which soon began to yield. The second finger of the right hand, most successfully operating as a wedge, dilated the cervix, until the finger in the centre of its circular ring met the thumb of the left hand within the vagina, using the thumb at times to re-invert the cornu, after the manner of Nœggerath. This manipulation was continued for thirty minutes, and, although pretty severe, was followed by no bad results beyond a little tenderness. The proceeding was resumed five days after, and carried on for an hour and a half, with partial success, the bulk of the tumor being forced beyond the cervical ring. A Barnes dilator was placed in the vagina to prevent further protrusion. The operation was resumed several times, and the upward force per vaginam was increased to about 20 lbs. The final manipulation occupied three hours and was crowned with perfect success. This was a most obstinate case, and was not overcome without an amount of compression and force which one would have expected almost to lead to serious results.

451. Mr. White of Buffalo, has recorded a successful case of fifteen years' duration. (See Report on Inversion of Uterus, by Dr. Quackenbush, Trans. Med. Soc., State of New York, 1859, p. 170.)

Dr. Marion Sims has proposed, in obstinate cases, to make a vertical incision through the structure of the uterus, on each side, at the part corresponding to the os; he thinks this would facilitate reduction.

Dr. Protheroe Smith reduced an inversion, thirteen months old, by means of compression made by a hemisphere of wood on a handle, and then by upward pressure for several hours.

Many more cases might be noticed did space permit. There is no doubt that anæsthesia has contributed much to the success that has attended the different methods of reduction. The chief elements of success, in addition to this, are a careful moulding of the uterus (which even in chronic cases is wonderfully plastic), and a steady upward pressure by the hand, aided by air pessaries. Sudden force, or exess of force, must be avoided.

A caution may be given in regard to the treatment of inversion, when co-existent with polypus. When this latter has a broad base, the fundus may be drawn down, and mistaken for the pedicle. The inverted portion has actually been excised, in such circumstances, along with the polypus.

Treatment by Excision.—This plan has been recommended when the case is found to be quite irreducible, and when the poor woman's existence is imbittered by the concomitants of inversion, such as ulceration, muco-purulent discharge; the dragging down, the debility, the inability to locomote, etc. The operation has been done frequently, with varying success. Dr. M'Clintock has had one or two successful cases; and Blundell, Teale, Hamilton, Davis, and others. Going further back, we find Paré, Petit, Dessault, etc., also successful. The operation is contraindicated if the uterus be affected with malignant disease.

Method of Operating.—Before the introduction of the *écraseur*, a ligature was placed around the highest part, and gradually tightened until strangulation took place, and the tumor separated. Some, after ligaturing, incised at once below the constricted part. At the present time the *écraseur* is employed, after drawing the tumor well down, and keeping a sharp look-out, so as not to include contiguous parts.

CHAPTER XLVIII.

PROLAPSUS UTERI: PROCIDENTIA.

452. A falling down of the womb is by no means a rare accident. It may occur soon after labor, or quite unconnected with parturition. When it occurs after delivery, it is usually in a few days, and probably owing to the woman sitting up too soon. It has been divided into the complete and the incomplete; the former embracing those cases where the uterus has appeared externally (in which case it has also been termed Procidentia); the latter those where, though it has gravitated somewhat, it remains within the vagina. We cannot enter at length, in a work of this kind, into a discussion of the interesting subject of causation, but must content ourselves with almost a simple enumeration of the causes. They are divided into the pre-disposing and the exciting.

1. *Pre-disposing Causes.*—These are: (1.) An unusually large pelvis, with deeply concave sacrum, permitting of retroversion of the uterus. (2.) Relaxation of the uterine ligaments, more especially the utero-sacral. (3.) Rupture of the perinæum. (4.) Relaxation of vagina from leucorrhœa, etc. (5.) Prolapse of vagina. (6.) Prolapse of rectum. (7.) Prolapse of bladder. (8.) Hypertrophy of uterus. (9.) Uterine polypi and fibrous tumors.

2. *Exciting Causes.*—The action of the abdominal muscles and diaphragm, when suddenly or forcibly called into play, as in coughing, lifting heavy weights, straining at stool, etc.

453. One of the most important cases is the weakening of the utero-sacral and broad ligaments. These take a great part in the maintenance of the uterus in its position. The vagina also supports it considerably, the womb resting on it as on a firm though elastic pedestal. When the former is relaxed and enlarged, it is no longer so effectual a prop, but permits of uterine descent. Another thing which paves the way to prolapse is a retroversion of the uterus. In its normal position its axis does

not correspond to that of the vagina; but if it falls a little, it rests on the posterior vaginal wall. When it is retroverted, however, its axis is made to correspond more with that of the vaginal canal, and it may then glide out, or be forced out, much more readily, unless buttressed well by unimpaired ligaments above, in front, and behind. We have discussed the subject of retroversion at length in the Edin. Med. Jour., March, 1869, and beg to refer the student who wishes a fuller account to that paper. This relation of ruptured perinæum to prolapse is similarly explained. Rupture destroys the curvature of the vaginal canal, shortens it, and brings its axis into correspondence with that of the long axis of the uterus, thus favoring the gravitation or descent of the womb when the other conspiring causes of prolapsus—weakened ligaments—are present. We have treated at length of this connection between lacerated perinæum and prolapsus in a paper published in the Edin. Med. Jour., 1871.

Though prolapsus is most common among parturient females, and elderly women whose pelvic and labial fat have been absorbed, it is by no means rare to meet with it among virgins. We are not, however, to be surprised at this, for the uterine supports may be weakened during menstruation; and even though the vagina be pretty tense, if retroversion were present, it would not offer so great an obstacle to descent. We believe that in virgins it will be found that retroversion has usually preceded prolapse. An unrelaxed, a close and strong vagina, is a useful uterine prop; but it is not contended that it offers an impassable barrier to descent. We suspect that in many of these cases, too, there has been some sudden straining or lifting of heavy burdens, or severe and protracted coughing. We have seen procidentia occasioned by a chronic cough.

Hypertrophic Elongation of Cervix.—M. Huguier viewed elongation of the cervix as a cause, but mere elongation is not prolapsus, any more than lengthening of the uvula is.

454. *Symptoms.*—Pain in the back, bearing-down sensation, leucorrhœa, and sometimes menorrhagia. Difficult defæcation and micturition; vesical inflammation. The stomach sympathizes generally, and it may be irritable or dyspeptic. Pains in the bowels and distension of the abdomen occur; the woman is often depressed in spirits, and very miserabl In procidentia locomotion is much interfered with.

Treatment.—If it occur soon after labor, it should be returned, and the patient made to remain in the recumbent posture, with the legs a little elevated. During the lochia no pessaries can be used, or anything in the way of astringents to the vagina. Tonics, however, such as iron and quinine, may be given, with a generous diet, in order to strengthen. We are fond of nux vomica also as a strengthener of the uterine ligaments. Its power in this way is not inferior to that which it exerts in cases of intestinal and vesical atony.

In elongated cervix it is as well to remove a portion by means of the écraseur or knife. We have operated in several cases with the knife, and found the bleeding easily checked by perchloride of iron. The galvano-caustic method is very useful where the neck of the tumor is small. In employing the écraseur, it is well known that, unless great care be exercised, contiguous parts may be drawn in and removed. This has been done frequently, and probably if we had operators as ready to give us the benefit of an account of their mistakes as Pirogoff and Velpeau were, we would have a tolerably sombre catalogue. By reticence as regards errors—by throwing a mantle over blunders—some of our greatest men have much retarded the progress of science. The details of success are much enhanced by the details of failure.

Means for Supporting the Uterus.—These are, pessaries of various kinds, and operations for constricting the vagina.

Pessaries.—Formerly the globular wooden pessary was much employed, but it dilated the vagina considerably, and thus rendered this pedestal of the uterus less capable of rendering support. Various shapes of air-ball pessaries have been employed with varying success. The best is the disc-shaped, or oval, flat pessary, made of gutta-percha. Dr. Meigs' ring-pessary is a useful one. It is constructed of watch-spring, encased in thread, and then coated with gutta-percha. Dr. Hodge's is one of the best. The principle of affording support by means of a stem fixed externally we believe to be a good one.

455. *Operations for Constricting the Orifice of the Vagina.*—Mr. Baker Brown introduced an operation for constricting the vaginal aperture. He removed a horse-shoe-shaped piece of mucous membrane from the vagina, close to the posterior commissure, and then brought the denuded surfaces together by quill and interrupted sutures. This diminished the ostium vaginæ considerably.

Constriction of the Vaginal Canal.—Where the narrowing of the vaginal aperture and lower part of the canal are inadequate, the constriction of the higher portion has been carried out. There are several methods of doing it. Dr. Marion Sims removes a V-shaped portion of mucous membrane from the anterior wall, the apex of the V being near the urethra, and the two arms reaching near to the side of the cervix uteri. He then brings the pared surfaces into apposition by sutures. These he retains from ten days to a fortnight.

Other means of narrowing the canal consist of pinching numerous folds with small forceps, which are left in until the membrane separates; and destroying portions of it with the actual or the potential cautery.

456. *Astringent and Tonic Remedies.*—When the prolapse is not extensive, and one obvious cause of the descent is a relaxed and enlarged condition of the vagina, good may be obtained by means of astringent applications. We have often rendered a very flabby vagina tense by means of a strong solution of tannin (10 grains to the ounce), or alum, or sulphate of zinc. As before said, the internal use of iron and nux vomica helps exceedingly.

Failure often results even from the operations for vaginal constriction. When such is the case, we believe it to be greatly owing, in many cases, to retroversion (without flexion). When the womb is retroverted, and the ligaments (especially the utero-sacral) are relaxed, it will gravitate much, despite this narrowing of the vaginal canal and orifice. Mechanical support, then, will alone maintain it.

If the procidentia has been of pretty long standing, and the vagina has become indurated and thickened, there will be some difficulty in effecting replacement. But we must seize and compress the uterus with the greased hands, and make steady upward pressure, the patient being on her back, and with the pelvis elevated. Thus may this plastic organ be compressed and moulded, and reponement rendered more practicable.

457. **Vaginal Rectocele.**—This consists of the protrusion of a portion of vagina and rectum through the vulva. It was termed Rectocele by Malgaigne, who described it in 1838. (See Mémoire sur un Prolapsus Rectocele Vaginal, etc., Paris, 1838). Other observers knew it well

enough before, such as Sabatier; and Sir C. Clarke portrayed it accurately under the term procidentia vaginæ. It is singular, however, that, while Clarke termed a prolapsus of the anterior vaginal wall with bladder, procidentia vesicæ, he should have ignored the rectum in the prolapse of the posterior vaginal wall. Simple prolapse of the posterior vaginal wall (without rectum) is very rare. The same is true of the anterior wall, the bladder usually depending also.

Causes.—A rectocele is usually of gradual formation, although it may be suddenly occasioned by lifting weights, or stumbling, or falling. The common cause of the gradual production of the tumor is a relaxed condition of the vagina and laceration of the perinæum. When this latter is torn, the vagina loses support; and it is often relaxed from child-bearing, leucorrhœa, etc. Fæcal matters coming down into the rectum distend its anterior surface, and this having lost efficient vaginal support, a pouch is gradually produced. This pouch has no tendency to diminish, but, on the contrary, increases, for the muscular fibres of the rectum become enfeebled by stretching, and are unable to expel its contents. At the same time, the straining, the action of the abdominal muscles, instead of overcoming the sphincter, just helps still further to enlarge the pouch. Thus a prolapse is produced. We have seen an enormous collection of fæces in some of these cases. The student must keep in mind that the posterior surface of the rectum is not prolapsed, but maintains its normal connections.

458. A posterior vaginal prolapsus tumor, while rarely simple, may yet be laden with something else than rectum. Intestine may descend betwixt the vagina and rectum, pushing the recto-vaginal fold of peritoneum before it. Ovaries and ovarian cysts may also gravitate here.

Diagnosis.—You may see or handle the tumor. Then, on making the patient strain, it increases in size. By placing the finger into the rectum, we will find that there is a dilatation of it, and that it is pouched.

Symptoms.—Persistent constipation; bearing down in the region of the perinæum; a feeling of weakness, and of a "falling through" of parts. The bowel can be evacuated only with great difficulty, and often it is necessary to support the tumor with the hand, and to squeeze the fæcal contents out. There is often profuse leucorrhœa.

Treatment.—The older remedies were enemata to keep the bowels open, astringent injections, and a globular pessary. Sometimes these helped. Dissecting away portions of mucous membrane to constrict the vagina contributes to success, but it is of more importance to construct a firm perinæum. Mr. Baker Brown recommended suture of the perinæum for the affection, and was encouraged with success. Mr. James R. Lane has described in the *Lancet*, February 3, 1866, an operation of his own for this affection, and it has proved highly satisfactory. His excellent paper is well worthy of a perusal, and his operation of adoption.

459. **Vaginal Cystocele, or Prolapsus Vesicæ.**—This consists of a prolapse of the anterior wall of the vagina, together with the bladder. The tumor is of a soft and fluctuating character. Sometimes the tumor is small; at other times it may gravitate so far as to hang between the thighs.

Causes.—It is rare in virgins; therefore the pathological changes induced by pregnancy and parturition must predispose to it. Its production is commonly gradual. The vagina becomes flabby, and offers diminished support to the bladder. The pressure of the urine, especially if it be long retained, establishes a pouch. As the ureters and the whole of the trigone are included in that part of the bladder which is attached to the vagina, there is never any long time allowed to elapse without fluid pressure on this part. The very first secreted drops bear on the pouch. The latter increases more and more, until a large globular tumor is produced, or it may be a smaller one, with a long pedicle. The attempts to pass water—the straining which is required—still further aggravate the prolapse. Violent exertion in presence of a full bladder will also enlarge the pouch.

Diagnosis.—From rectocele.—In cystocele we cannot push the finger in front of the tumor, while in rectocele we are able to do this. Then we may insert a catheter into the bladder, and detect its point in this tumor. In inversion of the uterus we cannot get the finger into the vagina; here we can push it far up behind the tumor, and may detect the os high up. It is a reddish-blue, soft, elastic tumor, and is diminished on evacuating the bladder. When the bladder is full, the tumor is smooth and shining; when empty, it is thrown into folds.

460. **Symptoms.**—Frequent desire to pass water, which is also done with pain and difficulty. The bladder becomes irritable, or even inflamed, and ropy mucus and fetid urine are discharged; the latter, owing to its decomposition in the bladder, which is unable to evacuate the whole. There is a feeling of weight and down-dragging, and distress in walking. Women are obliged to press up the tumor frequently, in order to promote micturition, or they rest on their hands and knees for this purpose. Sometimes there is incontinence of urine. The uterus is occasionally dragged down along with it; but, if not, the anterior lip of the os is elongated by the traction, and hypertrophied. Virchow and other pathologists have pointed out that renal disease—dilatation of the pelvis of the kidney, and atrophy of the organ itself—arises as a result of this displacement. This is owing to the ureters being dragged upon, and their bore diminished by this, and by being compressed by the tumor. When the accident is chronic, the mucous membrane becomes transformed into skin.

Treatment.—If the prolapse is but recent, much good may be done in the way of increasing the tone and tenseness of the vaginal wall. The woman should rest in the recumbent posture, and have her bladder evacuated by the catheter three times a day. Or one of Holt's winged instruments might be left in. Pessaries of tannin (and cocoa butter) should be inserted daily into the vagina, and a bit of gutta-percha sponge may be also inserted, but not large enough to distend the canal much. Tonics of iron and nux vomica should be given internally. When it is more chronic, an operation will likely have to be had recourse to. This consists, as in other instances which we have noticed, of the removal of more or less of mucous membrane, so as to diminish the canal of the vagina. The actual cautery is employed by some for this purpose; others dissect it off with the knife. A longitudinal piece, 1¼ inches long, ¾ inch broad, is removed just within the labia, the upper edge of the pared portion being on a level with the meatus urinarius.

CHAPTER XLIX.

UTERINE MISPLACEMENTS AND FLEXIONS.

461. These, though now frequently detected in the nulliparous womb, since Osiander, Schweighäuser, and Sir James Simpson called attention to them, are yet more prone to occur in connection with the parturient female. The misplacements may be in different directions, and these we shall notice, though only very briefly.

Retroversion.—In this form the fundus has fallen back into the hollow of the sacrum, and the os and cervix point anteriorly. Dr. William Hunter was the first to give a clear description and accurate illustration of it as it occurred in the gravid state. The causes are divided into the predisposing and exciting.

1. *Predisposing Causes.*—These are: (1.) A large pelvis, with a deeply concave sacrum. (2.) Relaxation of the uterine ligaments, particularly the round. (3.) Enlargement and increased weight of fundus, rendering the uterus top-heavy.

2. *Exciting Causes.*—Forces acting on the uterus, such as (1.) A distended bladder. (2.) Action of the abdominal muscles.

The displacement may take place gradually, as we have seen it do during pregnancy (some cases of which we append); or, again, suddenly by lifting a heavy weight. When the bladder is too long in being evacuated, and becomes exceedingly distended, it may also tilt its neighbor over, though the distension of the bladder is often a result more than a cause, as we believe. Another view was this, that the uterus in making its ascent out of the pelvis is caught by the sacral promontory, and thus capsized. As regards the action of the abdominal muscles, we have remarked elsewhere in our paper on this deviation in the gravid state as follows: The female may have been lifting a heavy weight, or stumbled while walking, and suddenly endeavored to avert a fall. She may have been laughing, or coughing violently, or straining at stool, from the operation of a cathartic, or some morbid condition of the bowel. These are, no doubt, causes of some value; but they would be nowhere as factors without the co-existence of others. They only serve to complete an already incohated deviation, or to perfect it in the presence and with the aid of the predisposing causes. Were it not so, we should have retroversion much oftener, for these exciting causes are in operation, so to speak, every day. The mass of our female "hewers of wood and drawers of water," who do the rough work incident to their humble lot, could hardly escape the displacement.

462. We have thus indicated our belief, and still remain unshaken in it, that the displacement is commonly not sudden, but gradual, at least up to a certain extent. Tyler Smith, while noticing the commonly accepted view that an over-distended bladder is the chief displacing cause, believes that many cases occur from "impregnation of the uterus already retroverted;" that is to say, the deviation existed prior to conception, and was not rectified by it. We believe this to be true. Dr. Edward Martin of Berlin, in his admirable monograph (Die Neigungen und Beugungen

der Gebärmutter nach vorn und hinten, Berlin, 1866), attributes it to "defective contraction of the round ligaments and excessive action of the abdominal muscles." We shall conclude what we have to say under causation by transcribing another sentence from our paper previously referred to. Given a top-heavy uterus, not much exceeding the 4th month, lax ligaments, broad and round, a flaccid vagina, a flabby perinæum, and a deeply excavated sacrum, and you have the complete complement of pre-requisites for the overthrow of the womb, without assaults from the abdomen or bladder. The cases I have recorded support this teaching, uphold these views; for their origin could not be traced to, or connected with, any unusual or violent physical effort or force on the part of the patients; neither was the bladder primarily culpable. We observe with pleasure that our views have been adopted by Dr. Alfred Meadows in his obstetric Work, second edition, pp. 109, 110.

Diagnosis.—The finger passed into the vagina detects a tumor lying behind the posterior wall; transferred to the rectum, the same tumor is felt more or less blocking it up. The os is found upward, looking toward the arch of the pubis, and if one can trace the uterus from cervix to fundus, suspicion will be strengthened and confirmed. It is known from retroflexion by the canal not being bent, and by there being no fissure between the cervix and the tumor. Then the uterine sound in a nulliparous case will aid us. Introducing the catheter, too, will help in cases where there is great distention of the bladder, for the displacement has been often readily rectified after the evacuation of the bladder.

Retroflexion.—In this condition the uterus is bent, retort-like, upon itself. The fundus is thrown back, but the cervix, owing to this bend, does not point so much anteriorly. The point of flexion is usually at a part corresponding to the internal os. This was viewed by some authors as arising from atrophy of the part, the fundus and body above being enlarged. Virchow explains it differently. He thinks there is an anatomical cause, viz., that while the cervix uteri is closely attached with the posterior and inferior part of the bladder, the body of the uterus is unrestrained and mobile. If pressure or force is exerted on the more mobile and less restrained part, it topples, and may be overthrown, while the cervix remains undisplaced. When atrophy exists at the point of flexion, it is an effect of it. The muscular substance, as pointed out by Virchow, wastes, until a little flabby, fibrous, and cellular tissue only remains.

463. **Anteversion.**—Here the fundus is directed forward against the symphysis pubis, and the os, unless there be much flexion, points toward the sacrum. This is said to be more common than retroversion, but we have not found it so. There may, however, be numerous cases of moderate anteversion occasioning few, if any, troublesome effects or symptoms, and thus we may not be consulted in regard to them. There is also a physiological curvature, which may have been reckoned by those authors; and anteversion may be viewed as an increase of this inclination.

Causes.—An engorged condition of the anterior part of the fundus, due to chronic metritis, etc.; sexual intercourse, leading to retroversion of the cervix; vomiting, and other violent exercise; increase of natural anteversion, and obliquity of the uterus; contraction of the utero-sacral ligaments, co-existing with contraction of the supra-pubic ones, from congestion, etc.

Anteflexion.—In many cases of anteversion, as in retroversion, there is a bending at the junction of the cervix with the body of the uterus.

Diagnosis.—In anteversion we have not the tumor pressing on the rectum, but the os may be felt far back, and pressing on it. A hard, smooth, and rounded tumor is felt through the anterior vaginal wall. The use of the uterine sound enables us to tell whether this be uterus or not. An anteversion has led to the impression that stone existed, and lithotomy has been needlessly performed.

464. **Symptoms of Versions and Flexions.**

Retroversion.—This deviation in the gravid state produces distressing symptoms soon, the uterus being enlarged. We should have remarked that it can hardly occur after the 4th month. The os presses on the bladder, and the fundus does the same on the rectum. Defæcation and micturition are thus impeded. In the cases which we have met with during the earlier months of pregnancy, and where there was no flexion, the bladder symptoms were the chief. There was incontinence as well as pain. As regards the symptoms in the unimpregnated uterus, there has been much earnest, if not acrimonious, discussion. Some have deemed them mythical; others have portrayed them as grave and distressing. Doubtless, they are not uniform. In some cases, the deviation kindles symptoms; in others, it is the consequences of the displacement that originate these symptoms. Many complain of back pain, of dragging in the loins and groins, costiveness, tenesmus, painful micturition, abdominal pain, vomiting, and irritable stomach. When there is flexion, the internal os is mechanically contracted, and also, after a time, pathologically, for although the muscular coat of the uterus attenuates and wastes, the mucous one thickens, in consequence of the irritation to which it is subjected. Another result of flexion, when it is continued for some time, is congestion of the fundus and body of the uterus. From this condition again spring menorrhagia and hypertrophy in not a few cases. We believe that the congestion resulting from the displacement and the flexion is often the cause of much distress, and it is this suffering, more than the pressure on the rectum, in numerous instances (in the non-gravid state), which impels the woman to seek our aid. Leucorrhœa is another consequence of flexion and the os is sometimes preternaturally red and abraded. Above all, dysmenorrhœa, often of an aggravated character, results, there being impediments to the flow offered by the bending of the canal, and its constriction by the thickening of the lining membrane. Sterility is also a common consequence.

465. In *Anteversion* there is pressure on the upper part of the bladder, and interference with its distention and volume. Thus more frequent micturition is impelled. Pain arises from the pressure also. Retention is not so frequently caused, for it is only in extreme cases that an anteversion compresses the neck of the bladder. There is a weight over the bladder, as it were, and the woman feels it more on walking or stooping. Uneasiness may be felt about the rectum if the os presses much upon it, or pain and difficult defæcation. The cervix, however, will not impede rectal evacuation so effectually as an enlarged and retroverted fundus.

Treatment of Retroversion and Retroflexion.—In retroversion, during pregnancy, catheterism with position is almost enough to ensure reponement. The common obstetric position is good, but that on the knees, with the nates elevated, is better. The advantages of this posture were pointed out long ago by Marion Sims, an able and worthy obstetric surgeon, as all are aware. They are these: The pressure of the abdominal viscera is removed; the uterus gravitates with these in the direction of the epigastrium, and is also assisted in its change of position by the entrance of the atmospheric air. In this auspicious posture, and under favorable circumstances, it has been found to recede, or even bolt suddenly up. A little pressure may be required, however—that of the finger on the fundus, introduced either by the vagina or rectum, at the same time, if need be, bearing down the cervix sacrum-ward. This duplex movement—*basculation*—will rarely be found to fail. When the uterus is replaced, the next indication is to maintain it there until it goes safely above the brim; for, up to the period when its increased bulk renders return impossible, there is a proneness to a renewal of the deviation as a matter of course.

For this purpose—that of maintaining normal position—posture again will sometimes be enough. Lying on the belly is lauded by many, and undoubtedly it is the most favorable posture; but your patient will soon tire of lying in that position, and go to one or other side: not much matter, for this is next in value to abdominal recumbency. It is as well, in addition, and indispensably necessary among those prevented from lying by the call of inexorable necessity, to plug the vagina carefully and well. Any soft pessary will prove an effectual prop—tow, or cotton, or linen, etc.: *soft*, we say, because it is ungainsayable that any hard article in this canal only conduces to the relaxation and enfeeblement of it; bad practice, because undermining one of the chief pillars of the organ we desire to prop. If our pessary is steeped in an astringent solution, such as of tannin, gr. x. to the oz., so much the better, for this will impart tenseness to the vaginal walls, and increase the vigor of this inferior support. This firmness, however, is somewhat temporary, and must not be confounded with more permanent tone. The latter is best, if not only obtained by internal remedies. And how vastly important it is to attend to these, if *our* view of displacement be the right one! If an over-distended bladder, resulting from carelessness, or mental absorption, or diffidence, be the paramount cause, then physic may be thrown aside; but if lax supports (coupled with a large pelvis) be the chief thing, then prevention, which is "better than cure" may be achieved by strengthening the former. What have we for this purpose? Change of air, salt-water baths, iron, and nux vomica.

466. In cases unconnected with gestation, there has been no little variety in the way of treatment; but the means employed have consisted largely of different forms of pessaries, and internal and other remedies, to reduce the size of the uterus, and overcome, if possible, its induration. If the displacement be of long standing, the fundus may contract adhesions in the recto-vaginal pouch, which it would be impossible and unsafe to break up, and thus treatment be hopeless. The uterine sound tells us the feasible and the impracticable cases. If we pass it into the uterus (with its concavity backward), and then cautiously twist it round on its axis, so that its concavity is then turned forward, we ascertain the amenability of the case to treatment so far. If it is easily twisted round, the tumor at the same time disappearing from the posterior part of the vagina, the case looks hopeful; if with difficulty, less so; if not at all, then we may infer that it is impracticable.

As in this displacement in the gravid state, so in a recent case in the non-impregnated condition, position will help much. The sound may be also applied every two or three days to straighten a little, if need be, and help reponement. If there is congestion and hypertrophy, it is better to disgorge and soften first. Not a few notable authors have laid more stress on this than on mere propping by means of pessaries. Among these we may name Oldham, Schmitt, and Schweighäuser. The latter gave laxatives and antiphlogistics, and enjoined rest. Dr. Oldham administered corrosive sublimate in small doses, so as to promote diminution of the size of the uterus. A favorite with us is a mixture as follows: One drachm of iodide of potassium, two drachms of bromide of potassium, and six ounces (fluid) of infusion of calumba—mix, and a tablespoonful twice a day. Nothing will overcome induration, or reduce hypertrophy, better than iodine and bromine. They will make any one, in time, lean, so efficient are their deobstruent properties.

467. Leeching the womb is also had recourse to. After enlargement has been reduced and induration overcome, replacement is attempted. There are some instruments for the purpose, but none so useful and safe as the finger. You insert it into the rectum or vagina—the former being best—and bear steadily on the fundus; at the same time, if need be, retroverting the cervix with a finger of the right hand, or by means of the sound. We have met with cases where the os was so contracted that the sound would not enter; but we succeeded by means of a probe, cautiously introduced. The bowels and bladder, we need hardly repeat, demand previous evacuation; and, as before said, the best position for the woman is that on her knees. When we have dislodged the fundus from its unnatural bed, we ought to enjoin rest on the belly until the proper means for maintaining it in its new, but normal and natural, position are obtained. When the congested condition of the uterus has been cured, we ought to remark that, in some cases, spontaneous replacement has came about: the uterus lightened has been reponed by its own supports.

We have now to observe that many cases are met with where the womb has been bent on itself so long, that it is absolutely necessary to restore it to its natural (long) axis before attempting to replace it. And, indeed, just as after reduction of hypertrophy—the curing of inflammatory conditions—the organ has become normally reinstated by its own attachments, so, after restoring the natural curve of the canal of the uterus, a spontaneous restoration results in some cases.

468. **How to Overcome Flexion.**—We overcome flexion by means of tents, bougies, and the uterine sound. Tents of tangle are now much employed. In connection with the use of tents, we may remark that some females betray an extreme intolerance of them, just as some males tolerate the catheter badly. We think that this is oftener the case with those who suffer from congestion and inflammation of the uterus.

Appliances for maintaining the Uterus in Situ.—These are almost as numerous as the scattered leaves in autumn time. What is the meaning of this profuseness? Partly a panting after immortality, but more so owing to the difficulties of the case. There are some wombs that will not prop, any more than ruined buildings; with them all kinds of pessaries are a failure. The fundus will go to the sacral hollow, whatever treatment one may adopt; or what is just as bad a plight, it will fall upon the bladder. Levret used a disc pessary, with an aperture to embrace the cervix; and Schmitt, who discussed this subject elaborately, used the same means, after employing the Schweighäuserian preliminary treatment for reducing the congestion of the uterus and pelvic viscera. Sir James Simpson struck out into a novel track; he invented the intrauterine pessary. Velpeau employed one on a similar principle previously; but, like Mr. Gossett's metallic sutures, it enkindled little interest.

469. Sir James Simpson laid stress on maintenance by mechanical means after reposition, and he at one time employed this stem pessary largely. To him also is justly due the credit of calling particular attention to these misplacements; of assigning due importance to deviations which was either much overlooked or greatly underrated. We shall not minutely describe his pessaries; suffice it to say, that the chief and novel feature was the intra-uterine stem. He straightened first with the sound, etc., and then introduced his pessary. Now, was this method of maintaining position useful and efficient? There are conflicting opinions on the subject. Some praise, others denounce, We believe the truth to be this: that in many cases much good was done by means of them, but in others, no little evil. It maintained the uterus in its normal site, and, after withdrawal, it remained normal in many cases; but in others, back it came into the old position. But could it not have been kept permanently in? Scarcely. There are some females who wear it uncomplainingly, and with benefit, for a long time; but there are others who are never well until the foreign article is out again. They suffer a deal of uterine pain, and leuchorrhœa and menorrhagia are occasioned also. But graver results than these have been brought about by it, viz., metritis and peritonitis, ending in death. At other times the perforation of the womb, with a similar result, has happened. It is much to be regretted that Sir James did not give us his experience of the dangers of the intra-uterine pessary.

470. Professor Scanzoni says, in a note attached to Kiwisch's work. the posthumous edition of which he edited, " that the observation of fifty-four cases of flexion of the uterus during the past four years, compels me to express my decided conviction that the mechanical treatment of this affection is either useless or positively mischievous. Since I have discontinued leaving the sound in the uterus, and left off employing the uterine supporter, and have contented myself with the use of cold vaginal injections, with the antiphlogistic treatment of any chronic uterine affection, and the application of caustic to any ulceration of the os; and, further, with the endeavor to remove the chlorotic symptoms, which are seldom absent, I have been much better satisfied with the results of my treatment than I was at the time when I allowed myself to be seduced into the application of a variety of mechanical contrivances." This is well worth giving earnest heed to, coming, as it does, from one of such enlarged experience as Scanzoni.

The evils springing from the use of the intra-uterine pessary were often due, doubtless, to its being allowed to remain too long in, and to its introduction when inflammatory conditions existed. It should not be permitted to remain above a few hours at first, but be removed and reapplied for a little longer time, until it is seen how the patient tolerates it. Then it should not remain in during the menses.

Dr. Hodge's pessary is a very efficient one in many cases, and we have found it keep up the fundus well. It is composed of a bar of metal, bent to a horse-shoe shape, and coated. One part presses up behind the cervix, and the rest is retained by the vaginal wall lower down. This method was invented by Dr. Hodge. Dr. Priestly applied pressure in the same way; but instead of supporting the instrument simply by the vaginal wall, he connects his pessary with a stem, which is attached to four tapes outside. This, we think, secures better and firmer support.

Dr. Graily Hewitt uses an ebony intra-uterine stem, supported by an ingeniously-contrived oval vaginal pessary. We should think it would prove a useful means of support after the troubles of introduction, and provided it did not enkindle the intra-uterine pessary evils. The student will find it described and figured in his able work on Diseases of Women, p. 454, second edition.

471. The following are the cases of retroversion in the gravid state previously referred to:

Cases.—Case I., Feb. 8, 1864.—Called to see Mrs. S., Jordan Lane, Morningside, said to be suffering from difficulty and pain in making water. On arrival, found that she had suffered more or less for several days, and had failed to be benefited by some of the simple and popular diuretics, such as the acid tartrate of potass and spirits of nitre, which she had tried of her own accord. At first she could make a moderate amount, but now not more than a few drops could be passed, and that with effort and straining. She was not aware of having strained in any way, being unaccustomed to rough work; and she was free from cough, and regular in the bowels. Was certain that her symptoms—her difficulty of passing urine—came on gradually, and steadily deepened. She thought her trouble just due to her being "in the family way;" for on former occasions, about the same period, she was similarly affected, though not to so serious an extent. On examination per vaginam, I found the canal somewhat obstructed by a tumor, which was also easily felt per rectum. Guiding the finger up toward the pubis, the os was easily recognized lying a little below the orifice of the urethra. I then traced the uterus along the cervix and body, and, of course, deemed the case quite clear. Introduced a small flexible catheter into the bladder, and drew off a very large quantity of urine, much to the relief of patient. The uterus did not "bolt up" on the evacuation of the bladder, but the merest show of pressure on the fundus reponed it, the os coming down as the former went up. Ordered her to lie in bed.

On calling the following day, I found renewed complaints of difficulty and pain in passing water, and on examination found a complete renewal of the displacement, Mrs. S. had risen for a little, and this had proved sufficient to induce a relapse, Replacement was again easy, and after it I stuffed the enlarged vaginal canal with linen, and enjoined rest for a day or two.

There was no renewal of the deviation, and patient went to the full time, and had a very speedy labor on the 10th of July, (1864).

I may mention that Mrs. S. is one of those desirable patients who have remarkably speedy labors, her children, owing to superabundance of pelvic room, coming home almost before one can arrive on the scene.

Case II., July 12, 1865.—Called to see Mrs. L., pregnant for the fourth time. Woman with large pelvis, of pale complexion, and flabby muscles. Had suffered for a day or two from pain in evacuating bladder; urine only dribbled away. Had tried gin, but without any relief—nay, apparently with aggravation of the distress. Inquired if she had been exerting in any way, lifting heavy weights, etc.; but she could not recollect of such. An examination immediately revealed retroversion. The fundus was pressing on the rectum, and the os, somewhat indurated, bearing on the bladder, though only slightly; flexion existing to some extent. On passing the catheter, which entered easily, a good deal of water came away, but not so much as I expected from the history of the case. It was clear that, owing to the flexion, the pressure of the os on the urethra had not been very great. I pressed on the fundus, the patient being on her side, but it ascended slowly. I then altered her to Sims' favorite posture, and found it to enhance very much the facility of reposition, much less force being required, and the organ making a speedy and sonorous ascent. Plugged the vagina, and ordered rest. The former was retained for a day or two; but the latter was not carried out. There was, however, no return. Patient went to full time without further trouble, and was delivered on January 4, 1866, the labor being easy and short. I had anticipated this, and, although early on the ground, had only to superintend the third stage.

472. *Separation of the Recti Muscles of the Abdomen.*—In women who have given birth to a number of children, with lax habit and deficient muscular tone, a division takes place between the edges of the recti muscles in some part of the linea alba, owing to mechanical distention during pregancy, and also the straining—voluntary efforts of labor. It is usually detected after labor, although it may have existed before this and not been observed, owing to the enlarged uterus filling up the opening. If it be pretty extensive, a piece of gut may be admitted into it, and give rise to a gurgling tumor of a longitudinal shape. Sometimes this tumor will reach from the pubis to the ensiform cartilage, being at the same time several inches wide and deep. There seems to be little pain attendant on this separation, only some uneasiness. The edges do not unite again, and successive pregnancies may serve to aggravate it. The abdomen must be supported by a properly-adjusted bandage.

CHAPTER L.

INFLAMMATION OF THE MAMMA: MILK FEVER.

473. This is not an uncommon occurrence after delivery. A common time for it to happen is from a week to a month after labor. The tubular structure of the breast is usually attacked before the areolar texture. The inflammation may or may not go on to pus, more or less rapidly. Inflammation of the breast may occur during pregnancy, but is exceedingly rare. Those most liable to mammary abscess are delicate, strumous females.

Symptoms.—Rigors, sometimes severe, inaugurate the affection; then considerable fever. There is shooting pain in the breast, increased on pressure, which the woman is slow to bear. The pain often goes through to the back, and sometimes to the limbs, and the pulse is full, hard, and quickened. The pain, it may be observed, is greatest (and, indeed, often exceedingly severe) when the glandular construction is the seat of the inflammation. When it begins in, or is confined to, the cellular texture, it is less acute, nay, it may be almost absent. In this latter it more readily goes on to pus. On manipulating the breast, it is found œdematous, hard, and, it may be, knotted; or a distinct and painful enlargement may be felt. At first the skin may not be discolored, but by and by it becomes of a bluish-red hue. When pus forms, there is an exacerbation of the symptoms; the breast throbs, and the fever (milk) increases.

The constitutional symptoms in some are very severe, there being rigors, high fever, cephalalgia, and pains in the limbs, as well as the breast, preventing rest and sleep. The woman will sometimes declare that her condition is worse than that of labor itself. Abscesses may form in different parts of the breast. In some bad cases, where the woman has been in feeble health, and where, perhaps, she has not allowed proper treatment to be applied, hectic symptoms have set in, and, after months of suffering, she has sunk from exhaustion.

474. **Causes.**—Cold is a common cause; but perhaps a more prevalent and potent one is an arrestment of the secretion by a blocking up of one or more of the lactiferous tubes. This stagnation may be owing to the woman neglecting to apply the child often enough, either from being absorbed by other duties, or from fear of the pain and annoyance it causes, especially if the nipple be excoriated. A sore nipple may be often justly impeached with it, for this reason—even when she does apply the child, the pain is sometimes so severe as to prevent a due emptying of the breast. The congestion often attendant on the secretion of the milk may also help to obstruct the ducts. Other causes named are injuries, mental emotion, and extension of inflammation from the nipple.

Treatment.—Leeches applied early check the inflammation. On removing them, promote bleeding by fomentations. The following purgative should be given also early: One fourth of a grain of tartarated antimony, and an ounce of sulphate of magnesia, in 6 or 8 oz. of lukewarm water. Some give nauseating doses of antimony—one sixteenth of a grain every hour, stopping short of emesis. We have seen cases fairly checked by one emetic dose of antimony. The milk should be extracted from the breast from time to time, either by the mouth or a tube. Poultices of flour bread, with a little palm oil, are useful. The saline purgative, with antimony, will sometimes check the inflammation, aided, perhaps, by fomentation with warm vinegar, or a warm acetate of lead lotion. When pus is likely to form, we must encourage it by frequent poultices. A useful one is made of pulv. lini, with a little resinous ointment on the surface. When pus has formed, it should be opened early, in order to avert the chance of burrowing, and production of numerous troublesome sinuses. If the abscess be on the anterior surface of the breast, superficial, and not exciting much pain, there need not, according to the high advice of the late Sir Astley Cooper, be any hurry in incising. Artificial opening is, however, undoubtedly better than spontaneous. The woman is often so worn out and irritable with the pain, that we are obliged to give her chloroform before using the abscess knife. Occasionally we will have to give a draught of morphia, minims 25 to 30 of the liquor, to lull pain and secure rest. Strapping is useful during the suppurative stage; it helps the evacuation of the pus, and averts sinuses. It is useful as a support to the breast also in the inflammatory stage. A broad strip of plaster may be brought from the axilla downward and under the mamma, then upward on the other side as far as the clavicle. Sinuses must be opened. A nutritious and restorative diet, with change of air, is called for, if the case has been severe and protracted.

475. **Excoriated Nipples.**—When the nipples are chapped, peeled, or excoriated, there is often distressing pain. It may only be a very small crack, but still it is sufficient to prevent the female, in many cases, from applying the child. Engorgement of the ducts then follows, and, as we have seen, inflammation and suppuration. Truly, here a small spark

has frequently kindled a great fire indirectly. The excoriation usually begins the first week.

Causes.—Dryness of the nipple, and the dragging of the child in sucking. This dryness may be owing to deficient sebaceous secretion, or to its being rubbed off by the child's mouth. It is supposed that an aphthous condition of the infant's mouth may give rise to this ailment, but we suspect that the aphthæ are sometimes the result of the sore.

Sometimes there are numerous cracks or fissures, and the surrounding skin becomes reddened and excoriated by the discharge from the sore. Frequently the nipple ulcerates, or wears away altogether.

Treatment.—It is of great importance for the practitioner to be able to cure this little but painful ailment. If he does so, he will get a thousand blessings from the sufferer. There is a preventive treatment that may be first noticed. During the last month of pregnancy, the female should strengthen the nipple, and accustom it to its future work gradually. We recommend it to be rubbed (and drawn out a little at the same time) with an ointment made as follows: Tannin, gr. xii; borax, gr. xxx; camphor oint., an ounce. We prefer that to spirits and water. Too often the female neglects the prophylactic treatment; so interwoven with the human character is the procrastinating spirit. We will be glad to have existing agony alleviated; but to anticipate it, and provide against it, if possible, belongs to few. The injunction, "take no thought for to-morrow," is, in relation to this, extremely well obeyed.

476. For the sore—the cracks and excoriation—many applications have been suggested. We shall detail a few useful ones—1. Extract of rhatany, 12 grains; cocoa butter, 2 drachms; mix. 2. Argenti Nitris, 8 grains; aqua rosæ, an ounce; mix. Apply the lotion with lint or brush three times a day. 3. Application for a night of collodion to the nipple. 4. Application of fine gum-acacia powder all over the nipple every time after the child leaves it. It is applied with a brush, and is a very succesful plan. 5. Tannin, 4 grains; borax, 30 grains; glycerine, an ounce. 6. Wearing of leaden or boxwood shields for a time. A nipple shield, with a soft, clean teat, is very useful. The child may suck it, and thus the nipple is protected, and gets time to heal. We have seen them heal in a few days when thus protected, after all kinds of lotions had failed. The gum-acacia is an excellent application, and was suggested by Dr. H. M'Cormac of Belfast, who has written an admirable paper on mammary inflammation. There is another preparation we have used successfully, viz., the following ointment: Tannin, 30 grains; gum-acacia, and powder of borax, of each, 40 grains; camphor oint., an ounce: mix. Apply a little to the nipple every time after the child has been at it; then wash the nipple with warm water and glycerine soap, just before the re-application of the infant.

The student should master the therapeutics of excoriated nipples well, for he will encounter this complaint fifty times for once that he will see a case of mania, or eclampsia, a Naegalé's pelvis, or a prævial hemorrhage.

477. **Retracted Nipples.**—The nipples are sometimes so much flattened, and even drawn in, that the infant cannot grasp them. The sinking in comes of tight-lacing—tight-lacing strongly to be condemned, We must endeavor to draw out the nipple again by means of a breast-pump or gutta-percha sucker. This must be done early, for if we delay, the secretion of milk leads to mammary distention, and increased retraction of the nipple. Sometimes a child of six or nine months is applied,

with the view of drawing it out; at other times an adult. In the larger cities, such as London and Paris, there are nipple-woman, like the schoolmaster "abroad," whose chief occupation is to manufacture nipples; that is, to suck them out from their hiding-place at the bottom of a fossa, and make them bas-reliefs—promontories which the infantile mouth can grasp and hold by. Occasionally it won't do, owing, perhaps, to the nipple being congenitally small and deficient. If a decent and seizable nipple is not produced in a day or two, let nursing be abandoned. To persevere might only be productive of inflammation, and, perhaps, afterward pus, because encouraging the milk, and yet not relieving the breast of it. To desist might avoid this, for seldom have the mammæ become inflamed when the child has been kept away from them.

CHAPTER LI.

LABOR COMPLICATED WITH CARDIAC DISEASE AND EMBOLISM.

478. We have now seen many cases of dyspnœa coming on during labor, and preventing the voluntary efforts of the second stage, and yet where there was no suspicion of pre-existing disease of the heart, or of the arterial system. In one case, the woman became intensely cyanotic, and the dyspnœa was so threatening that we had to deliver at once by version. The woman recovered slowly. We were called to see a somewhat similar case by Dr. Messer. Here there had been a good deal of voluntary effort during the second stage. Dyspnœa set in before the termination of labor, and the woman succumbed ten hours after, also from apnœa. In this case a post-mortem examination showed disease of the mitral valve causing some constriction. The left auricle, pulmonary veins, and lungs were gorged with blood. Yet in this instance the woman jogged on well enough during pregnancy, and complained of no breathlessness of an unusual kind. It was only after making strong respiratory efforts during the second stage that the intense dyspnœa set in, continuing until death. We have met with other instances where breathlessness and cyanosis came on during labor to rather an alarming extent, but passed off gradually after delivery. These cases are doubtless often due to embolism ; to deposits of fibrine, either in the pulmonary artery, or heart, and these are known to become disintegrated and removed. This would account for the relief of the intense dyspnœa.

Treatment.—In all cases of intense dyspnœa coming on more or less suddenly during labor, the indication is to expedite delivery. This may be done either by version or the forceps. If we have detected cardiac disease, valvular incompetency, etc., during pregnancy, we ought to lay an embargo on down-bearing—on voluntary effort, during labor. In point of fact, we should abbreviate the second stage by the most suitable operative procedure.

479. **Syncope during Labor.**—This is a syncope which occurs during the earlier part of the period of gestation, and which rarely eventuates in anything serious, if the heart is sound, but, on the contrary, is readily amenable to moderate stimuli. There is another that happens sometimes during parturition, and quite independent of flooding, or any in-

jury to the parturient organs; and this is equally remediable with the other, when the heart is free from organic disease. Delicate, cachectic, nervous, and hysterical females are the common and ready subjects of it, and it passes off readily under anti-spasmodics and stimuli: ammonia and whisky, or brandy, with cold water spray.

480. **Sudden Death.**—In addition to a light and remediable syncope, we have one unto death. You will occasionally meet with such cases. The labor may have progressed naturally and terminated happily, and yet the hapless female has suddenly perished. It ought to be mentioned that, in some of these cases of sudden death, nothing to account for the fatal result has been detected on making an examination of the body. Extreme flaccidity of the heart, and emptiness of its cavities, are the only conditions usually discovered. As many of these cases, then, happen without our being able to detect any cardiac disease, it is common to call them examples of cardiac paralysis.

Some of these instances of alarmingly sudden death in child-bed are, however, due simply to fatty heart. Dr. William Ziegler has given a description of one of these in the Edin. Med. Jour., for April, 1864. He was attending a lady in her ninth labor, when, "during a pain, accompanied by strong voluntary effort, she fell back unconscious on the pillow, and suddenly expired." In this case extensive fatty degeneration of the heart was found.

Sir James Simpson believed, and, we have no doubt, correctly, that not a few of these sudden deaths were due to embolism. A fibrinous plug from one of the larger uterine veins is borne along by the current of the circulation, till it becomes arrested in the pulmonary artery, and thus leads to a fatal result. There is no other explanation of those cases where no cardiac disease exists, and where there has been no flooding, saving the other one to which we have referred, viz., paralysis of the heart.

Another theory of the cause of death may be briefly noticed; it was broached by Legallois, about forty years ago. He thought that sudden death was sometimes produced by the admission of air into the current of blood by the uterine veins and vena cava. Dr. Rose Cormack (London Jour. of Med., vol. ii., p. 941) took up the subject, and gathered some cases where air-bubbles were found in the veins and heart. Dr. M'Clintock is also of opinion that this explains some of those cases. We are not sure if we can subscribe to this readily. Professor Martin, of Berlin, as we have seen, and others, do not now lay so much stress on the admission of a little air into the circulation. Dr. Ramsbotham has pointed out that there are instances where faintness comes on after labor, and may prove fatal, yet where the result is not so sudden, and time is given for remedies. The pulse flags, the face grows pallid, there is a cadaverous aspect, restlessness sets in, and the woman answers only by moans. By and by a sharp pain strikes her across the chest, and she swoons fatally away.

481. Numerous examples are on record where the death has resulted from organic disease of the heart or from fibrinous coagula. Dr. Meigs first showed this, and that where there was a good deal of blood lost, the remainder was more likely to become coagulated. This, we may remark, is also favored by enfeebled cardiac action, and a high temperature of the body.

Dr. Macdonald, Edinburgh, has written an able paper in connection with this subject. Gleaning from different sources, and adding his own experience, he has arrived at certain conclusions, which, on the whole, are in keeping with ours. We give the gist of them: Aortic insufficiency is very dangerous during the latter months of pregnancy and during parturition, but if the latter is safely got over, the serious symptoms are likely to disappear. Dangers arise partly from destruction of cardiac compensatory arrangements, and partly from the onset of endocardial inflammations. Cases of mitral stenosis are deemed most fatal.

Mitral insufficiency presents the least risk.

Serious symptoms chiefly affect the lesser circulation, and the pathological changes usually found after death are congestive bronchitis, pulmonary œdema, pulmonary apoplexy, acute endocarditis, etc.

The serious symptoms in such cases do not arise until after the middle period. Labor is generally premature.

482. **Treatment.**—Of course, when death sets in suddenly, nothing can be done; but in those cases referred to by Dr. Ramsbotham, time is given for stimuli, and no time should be lost in administering ammonia, or brandy, or champagne, etc., cold affusion, galvanism, heat to the inferior extremities, mustard over the chest, friction, etc. The recumbent position, with the head low, should be maintained. If we suspected organic disease of the heart, or were aware of it prior to labor, it would be our duty to expedite the second stage. Voluntary efforts, bearing-down, and struggling cannot be other than hurtful and dangerous in such cases. In suspected embolism, or where there was a tendency to clots, the carbonate of ammonia has been recommended. It conduces to fluidity of blood, and averts the tendency to coagulation, We do not agree with those who hold that the induction of premature labor should never be had recourse to. It is often the only means of saving the woman's life.

PART II.

PUERPERAL AND OTHER DISEASES.

CHAPTER LII.

PUERPERAL FEVER.

483. We now approach a subject which can, perhaps, be rivalled by no other in obstetrics in regard to the discrepancy of opinion which it has engendered, viz., puerperal fever. It has proved itself to be one of the most dangerous and disastrous of puerperal maladies, often sweeping off women in herds, and baffling all the means and remedies of the physician. It is a very ancient disorder (as well as a fatal one), having been described both by Hippocrates and Avicenna. It is a hydra-headed disease also, not always presenting the same phases; sometimes appearing sporadically, at other times prevailing as an epidemic; at one time mild, at another virulent; now sthenic, again adynamic. This diverse character, as well as the fact of differing post-mortem changes having been observed, has led to its being called by various names, such as puerperal fever, peritoneal fever, peritonitis, metroperitonitis, metritis puerperalis, child-bed fever, morbus puerperarum, and uterine phlebitis. When it appears epidemically it is usually fearfully fatal, few women escaping. There have been epidemics of it (for instance, in Paris, 1746) where almost all who were seized perished. In Edinburgh, a hundred years ago, there was a terrible epidemic, when every female who was seized succumbed to it. "It began about the end of February," says Professor Young, "and almost every woman, so soon as she was delivered, or perhaps twenty-four hours after, was seized with it, and died. All who were seized died, though every method was employed to cure the disorder." In more recent times, it has decimated our hospitals, and spread its terrific ravages into private practices. Before touching on the causes of this malady, we shall notice, as bearing on these, its strong predilection for lying-in hospitals, or rather, we should say, the great proneness it has to develop in these institutions. Take France first. M. Husson says, in regard to the Maternité, which is placed in an airy situation, carefully ventilated, and scrupulously managed, "that, for sixty years, all the combined efforts of the administration, and of the chiefs of the sanitary service, have failed to expel the scourge of puerperal

contagion, and the only palliative is the instant evacuation of the infected wards."

484. Trosseau remarks, in regard to Beaujon, an hospital of improved construction, that "there rules a rate of mortality so enormous that, if it were the type for the whole country, out of the 950,000 labors taking place annually, there would be 80,000 deaths, and France would be a desert in less than half a century." Dr. Hardy states that, in the year 1860, every instance of version practiced in the Maternité of St Louis was followed by fatal metro-peritonitis.

Dr. Barnes, who has investigated this subject carefully (see *Lancet*, Feb., 1865), got returns from the chief Hebammen Institutes of Germany for the years from 1850 to 1862, and these show a large mortality from this disease. There was an epidemic in the Royal School of Midwifery, Berlin, 1862. and hardly a single woman escaped. The building had to be closed. Without entering into details as regards the lying-in hospitals of Britain, it may be stated that their mortality has always been greater than that of private practice, and many of them have had to be closed from time to time.

Dr. Matthews Duncan some years ago published a work (Mortality of Child-bed and Maternity Hospitals, 1870), wherein he comes to the rescue of maternity institutions, which he thinks have been unfairly attacked and misrepresented. Dr. E. Kennedy had previously published a work on the same subject, and came to the conclusion that the generation of puerperal metria was in the direct ratio of the aggregation of lying-in women. The doctor made his deduction from tables of the Dublin Lying-in Hospital. Singularly, Dr. Duncan deduces from the same tables diametrically opposite conclusions. He says "that the mortality of that hospital does not increase with the increased number of the inmates—does not rise with the aggregation. The mortality is neither in the direct nor in the inverse ratio of the aggregation." When two gentlemen look at the same picture, and one of them calls it black; and the other white, there must be a visual film somewhere; or, further, this deducing of antipodean conclusions from precisely the same tables preaches a certain doctrine—viz., the utter worthlessness of statistics, or, if not that, their thoroughly plastic character. Dr. Duncan has done a good turn in showing that maternity hospitals are not so black as they have been painted, that is, those of them which have been fairly managed; at the same time, it will not do to deny that puerperal metria increases with the aggregation of labor cases.

485. We cannot overlook the fact that maternity hospitals in all countries have, from time to time, had their door-key turned: evacuation has been the only preventive of decimation; indeed, it has sometimes only followed in its appalling wake. This clearing out of the maternities, too, has been often necessitated when all was going on smoothly in private practice in the same cities; when there was not a whisper of metria in home cases. The hospital has been a perfect pest-house when the private home cases have been a salubrious garden, so to speak. If experience had not taught us the evils of aggregation, reason and analogy would have impelled us to an endorsement of the doctrine. It cannot be denied—it is universally conceded—that the lying-in female is extremely susceptible to the invasion of blood-poison. Well, then, in hospitals, the chances of being subjected to this are much greater than those in private practice, that is, unless a maternity be conducted much as a home practice, with numerous, well-ventilated rooms, and only a single patient in

each. We think the only right way to enable one to arrive at a satisfactory conclusion is to take a large domiciliary practice, or several of them, managed by men of a fair knowledge of their department, and one or more maternity hospitals, also administered in a fair way as regards professional skill, ventilation, etc. A quarter of a century's contrast of an hospital of this kind, and of a home practice, would enable us to make deductions on which we could rely. Several striking facts in this connection might be given had we space. Here is one. Dr. Joseph Clarke of Dublin conducted a large obstetric practice for upward of forty years, attending during that time about 4000 cases; yet he had not half a dozen cases of metria the whole time. Within the same four decades the Lying in Hospital had experienced several epidemics of this malady.

486. **Puerperal Fever—What is it?**—This question may still be put with the utmost propriety, and, for all we know, may continue to be pertinent until the crack of doom. The reason of the fitness lies here. The local disease, the post-mortem appearances, the organs involved, differ in different instances, as has been seen in innumerable occasions on dissection. If we examine enteric fever cases after death, we will be pretty sure to meet with tolerably uniform appearances—we will have the ulceration of the *glandulæ agminatæ*, etc.; but here it is sometimes metritis, and at other times peritonitis, now phlebitis, and again, simply an offensive effusion into the serous cavities. This want of a uniform character of the morbid appearances has led to a different way of designating it by different authors; nay, has led some to view it more as a local disease, in the first instance, than as a constitutional malady. It has been viewed by different authors, as follows:

1. Uterine inflammation of an erysipelatous nature.
2. Erysipelatous peritonitis.
3. Peritonitis.
4. Fever of a peculiar nature.
5. Disorder of a putrid character.
6. Abdominal inflammation.
7. Omental inflammation.

487. Dr. Robert Lee, who has written ably on this subject, and published numerous tables of the morbid appearances, etc., does not deem this disorder a specific fever, but has been led, from his own dissections, and those of M'Intosh and Campbell of this city (the latter of whom published an account of the Edinburgh epidemic of 1821–22), and others, to view it as uterine inflammation. That is an opinion also sanctioned by other great names, and certainly it does not want the character of plausibility. Extensive local lesions are usually found, but then, these may be effects, and not causes. They are all the more likely to be so, in our humble opinion, seeing that the disease has often arisen when the labor has been natural and easy, and no injury could have been inflicted on the uterus or its appendages. Another argument against this view, and in favor of its specific and idiopathic character, is this: that the malady is extremely contagious. Few who have dealt with it will deny this. Accoucheurs have been so strongly convinced of their having conveyed it from one part of a large city to another remote part, with sadly fatal results, that they have abandoned practice for many weeks, and gone in search of fumigation and purity to the breezy hills. Further, if we are to pronounce that the essence of the disease is local inflammation—inflam-

mation of the uterus, or its appendages—then what of the other lesions in more remote parts of the body pointed out by the pathologists, the alterations in the lining membrane of the alimentary canal, the joints, the pleura, etc.? If these are secondary, may not the others be the same? Further, it is believed that this fever may arise from exposure to typhus fever, or even erysipelas. The proper way to view this disease, then, we think, is to look upon it as a zymotic influence, or an animal poison, prone to invade the puerperal state, producing fever, and, as a rule, inflammation of the uterus or peritoneum, or some of the neighboring parts. The disease varies in its character in different seasons, sometimes being sporadic, at other times epidemic; at one time it is highly inflammatory, at another of an adynamic nature. The season of the year when it was most prevalent and virulent in this city was the end of winter and the beginning of spring; and this is true of the epidemics of the Continent also.

488. Scanzoni believes the main cause of this fever to be an altered and vitiated condition of the blood, and that the impurity consists chiefly of pus. This is a common theory, and plausible when we consider that the causes of vitiation are prevalent after parturition. Cruveilhier compared the internal surface of the uterus to a stump after amputation; and as in the latter case purulent infection is but too common, so in the former it may often arise.

The constitutional state of the puerperal woman (as well as the local condition) conspires to render her a prey to zymotic influences. Her blood is altered—it is viewed by many as inflammatory—and pregnancy itself has been deemed a cachexy. Thus the woman, when seized, rarely recovers. Witness an attack of scarlatina. The puerperal blood, then, seems not only a welcome soil to the zymotic poisons, but one offering feeble resistance to their virulence.

A very good division of the causes of puerperal fever has been made by Dr. Barnes (*Lancet*, Feb. 11, 1865), and with that we shall conclude this part of this deeply interesting subject. He divides them as follows:

1. External causes, or those agencies which, taking their rise in conditions foreign to the patient herself, have to be brought to her while she is in a state of susceptibility to their influence, in order that puerperal fever may be produced. These are heterogenetic.

2. Internal causes, or those which take their rise in conditions proper to the patient herself, there being no contamination from without. The poison, which ferments into fever, is generated within the patient. These are autogenetic.

Dr. Barnes views the disorder as arising from a specific poison, you see, which may be engendered within the woman, or carried to her from another infected source.

489. There is a very valuable paper in connection with this subject by my friend, Dr. Hicks, in the 12th volume of the London Obstetrical Society Transactions for 1870. Dr. Hicks rejects the old classification, which was according to the symptoms, etc., and substitutes that of the causes, so far as these can be discovered. He deals with 89 cases, and divides these into two groups, as follows: Group I., having an ascertained or probable cause. Group II., cause uncertain. Then group I. is divided into the following classes: Class 1, Scarlatina, 37; (A.) with the usual rash, 20; (B.) without rash, 17, 15 of whom had been certainly exposed to the fever, and 2 only probably exposed to it. Class 2, erysipelas, 6. Class 3, diphtheria, 7. Class 4, typhus, or typhoid, 2. Class 5, decom-

position of uterine contents, 9. Class 6, emanations from sloughy wound, 1. Class 7, from puerperal fever, 1. Class 8, from mania (?) 4. Class 9, pyæmia, from sore nipples, 1. Group II., cause uncertain—total, 21. (A.) Symptoms appearing before or during labor, 4; (B.) symptoms appearing about the third or fifth day, 17.

This paper tells a very striking and suggestive tale. It shows how important a factor here is zymotic poison, and that no form of it works more potentially than scarlatina. Erysipelas plays a part, too; but operated in a much smaller number of cases in this group. It is, however, in our estimation, a more potent producer of this fever than would appear from the statistics of Dr. Hicks. The continued fevers also show to a very limited extent here. Above all, it is strikingly manifest how much more prevalent are the heterogenetic than the autogenetic or subjective sources of the malady.

490. **Connection between Puerperal Fever and Scarlatina, Erysipelas, and Typhus Fever.**—Not a few authors have contended for the identity of these maladies; that is to say, that they are the offspring of a common influence, or zymotic poison; that the scarlatinal, or the erysipelatous virus, may beget the fever which we are considering. There are good grounds for holding and maintaining this view. We have seen, from Dr. Hicks' statistics, that more than 30 per cent of his cases were clearly owing to the scarlatinal poison; and others were traceable to erysipelas and other kindred poisons. Other considerations favor this opinion. For instance (1.), these diseases prevail largely during the same condition of atmosphere. (2.) The infants of women suffering from puerperal fever are extremely prone to erysipelas, and even husbands have been similarly infected. (3.) The fever has been caused by infection, carried from a patient afflicted with erysipelas, and from others laboring under typhus fever. We are always careful to clean and disinfect our hands, etc., after attending a patient with this latter disease before we visit our puerperal women. In regard to typhus, the following has frequently been observed: A doctor attends a case of typhus, and afterward visits his lying-in patients. Well, all these latter have been known to become thereafter seized with puerperal fever, though living in different and remote parts of the same town, and when the patients of other practitioners were exempt. These are striking facts, and speak volumes in favor of a similar specific, zymotic poison. At the same time, we must remember that there are autogenetic cases, mostly traumatic, some injury to the uterus or other parts having enkindled inflammation and fever.

Relation to Surgical Fever.—Sir James Simpson pointed out that there was a close analogy between certain varieties of this fever and that occurring at times after surgical operations. Some of the lesions found in pyæmia are similar.

491. **Symptoms of the Malignant—Adynamic—Form of Puerperal Fever.**—As the parts secondarily affected in this disorder differ, so do the symptoms. In this variety, which has often appeared epidemically, the effects are frequently intensely virulent. Sometimes it has attacked the lying-in woman during gestation, at other times during labor, or more commonly from several hours to two or three days after delivery. In bad cases the pulse soon becomes extremely feeble, and very rapid (130 or more), and delirium sets in early. There is often little pain, but great depression, anxiety, despondency, and apathy; sickness, and vomiting of dark, coffee-ground material. The countenance is of a

pallid or dusky hue, and sunken, and there is a dark circle around the eyes. A clammy, offensive perspiration covers the skin, and sometimes, but not always, there are severe rigors. The abdomen becomes immensely distended with flatus. A pyæmic odor marks the breath, and the tongue may be dry and brown, or clean. The lochia and milk may or may not be suppressed. The woman in these cases sometimes sinks in from thirty to seventy hours. Less severe cases are met with, where the initiatory sign is a severe rigor, beginning, perhaps, on the second or third day, followed by increased temperature of the skin and abdominal pain. Sweating is profuse, but there is less depression and weakness. The tongue is dry and furred, and there is unquenchable thirst. The pulse is quick, but hardly so feeble, and the breath has the peculiar sweetish odor. It may be remarked that the tongue is sometimes clean. There is occasionally suppression of the lochial discharge, but not always. Vomiting occurs, and diarrhœa. The abdominal pain may not be constant, but recurring, and gradually intensifying. Sweating is a common characteristic; sometimes it is very profuse, but does not reduce the pulse. The abdominal swelling, due to the secretion of air by the lining membrane, is often immense. exceeding that of full pregnancy, and distressing the woman much, at the same time impeding respiration and cardiac action. Pneumonia and pleurisy are common complications. The exhaustion may deepen, and carry off the woman, preceded, perhaps, by low delirium or coma. Death is sometimes hastened by pleuritic or pericardial effusion.

When recovery takes place, it is very slow, and the woman remains physically and mentally feeble, often for a considerable time.

Morbid Appearances.—In this form there may be no traces of uterine or peritoneal disease observed. An alteration in the character of the blood is common. It is dark, deficient in fibrine, and non-coagulable. It is sometimes mixed with pus, and this latter is found in the veins and other tissues, such as the liver and pleuræ. Pus and turbid serum have been found in the peritoneal cavity, and abscesses in the lungs. Gangrene of the lungs, and a friable condition of the uterus, ulceration of the stomach and bowels, have also been seen. In reference to the chemical changes of the blood, Vogel says that it contains some carbonate and hydrosulphate of ammonia, and lactic acid, and that the globules do not redden on exposure to the air. Respiration is thus imperfect. The globules are partly decomposed and dissolved in the serum.

492. **Treatment.**—The treatment of low puerperal fever is not an assuring page in the annals of obstetrics; still, good is done by remedies at times. There is a great sinking and deprivation of vital energy, and what will best maintain the flagging powers is best. The bleeding recommended by Gordon and Campbell, and others of half a century ago (men who, doubtless, took their cue from the worthies of olden and later times, Hippocrates and Galen, Sydenham and Cullen, etc., etc.), will not answer here. We believe with Dr. John Clarke that it will hasten death. Salvation can come only of careful stimulation. There is no better drug in this line than the aromatic spirits of ammonia. It should be given every hour in 15-minim doses; moderate quantities of wine, and extract of meat. Is opium admissible? Small and stimulating doses of opium, along with wine, especially if there is much abdominal pain, are useful. If there is no peritonitis, there is no need for it. When it is indicated, it should be given in half-grain doses every hour. Injections of castor oil and turpentine are highly recommended. Over the abdomen some

have painted iodine, others have blistered, or applied turpentine, or hot fomentations. Large, broad, but not very heavy poultices, often renewed, have relieved a little. If there is diarrhœa, it is not to be arrested. Quinine is viewed as of vast benefit by some; they push it on to large doses, believing that good is done when its physiological effects are developed. Mercury—calomel, that is to say, and mercurial inunction—would seem not to be of service in this type of fever. Are there any suitable antiseptics (internal)? We think some carbolic acid might be tried, in minim doses three or four times a-day. Then there are the hyposulphites and sulphites of Polli. They are, doubtless, antiputrefactive, and ought to have a fair trial.

493. **Symptoms of Puerperal Fever Associated with Peritonitis.**—This form of puerperal fever has prevailed so often—that is to say, lesions of the peritoneum have been witnessed so frequently in connection with it—that many believed the disease to be peritonitis. In addition to zymotic influence, it may arise from sudden chills, or a severe labor, or the extension of uterine disease. In many cases, as before remarked, it has set in after the easiest and most natural of labors. The seizure may begin before delivery; but it is usually after this, at a period ranging from twelve to seventy-two hours. Rigors, and a rapid increase of the pulse, with some pain, are the initiatory features. The pulse mounts up rapidly to 130, or even 150; the pain may be at first a little soreness over the lower part of the abdomen, then extending its area, and becoming acute. The belly enlarges, and excruciating pain is experienced on the slightest pressure over it. There is headache, nausea, loaded tongue, thirst. The tongue differs, but it is often dry and red in the centre, and white at the edge. The countenance is pallid, the features shrunken, and there is a dark circle around the eyes. The temperature of the skin increases at first, but then somewhat subsides. The breathing is hurried. The breasts become flaccid, and the lochia diminishes, or is arrested. The patient becomes apathetic and indifferent, and pays little heed to those around her. If questioned, she answers in sharp monosyllables. The pain, as Dr. Churchill truly observes, is sometimes not constant; it is at times pretty tolerable, but recurs in paroxysms of increased acuteness. More singular still, the pain may be absent. This is not often the case in this variety, however. As the disease progresses, the abdominal pain is so agonizing that the weight of a feather can scarcely be borne. Now the female lies on her back, with the knees drawn up, to avoid the tension of the parietes, and increase of the pain.

494. The uterus may now be detected through the abdominal wall as enlarged, and somewhat above the brim. The abdomen expands immensely from flatus, and later from effusion. The milk is oftener suppressed than the lochial discharge. Vomiting may persist a good deal, at first of the stomachic juices, then of bile, lastly, coffee-ground mixture. Diarrhœa sets in sometimes, and would seem to be beneficial in some instances, and the reverse in others. The stools are dark and offensive. The urine, which is scanty, soon deposits a brown sediment. Delirium is not often present, and the patient retains consciousness and sensibility to the last, as a rule. When death threatens, a cold and clammy perspiration breaks forth (different from the gentle diaphoresis marking the crisis sometimes), and there is a hectic flush on the cheeks. The breathing gets more and more hurried, and there is increased action of the heart. The extremities become cold, the pulse disappears from the wrist, and death ends the painful scene. Death usually occurs from the

fourth to the tenth day. The fifth is a common time. Those who wish to go more largely into this subject would do well to look into Dr. W. Campbell's book, and the little treatise of Dr. Alex. Gordon of Aberdeen; lastly, but not least, the work of Dr. Robert Lee.

Morbid Appearances.—If we examine the tables of Dr. Robert Lee, and the cases recorded by Drs. W. Campbell and A. Gordon, we will find considerable differences, as regards post-mortem appearances, in different instances. Sometimes the uterus exhibits the results of severe inflammation; at other times it is the peritoneum. Lymph is extensively thrown out, and pus and dark-colored serum is found in the peritoneal sac. Lymph and pus occur alike on the free surface of the peritoneum, and beneath it. This serous membrane is often intensely vascular, and thickened. Lymph is also thrown out on the intestines and omentum, gluing them together; and the ovaries are softened, enlarged, or the seat of abscess. The muscular tissue of the uterus is often softened and friable, of ashy-gray color, or even gangrenous. Pus is found in its sinuses. Collections of pus have been found in the pelvis. When a case has proved speedily fatal, a layer of semi-fluid lymph coats the various organs inflamed; when more prolonged, there is usually more profuse effusion, more remote parts suffer. The intestines are inflamed, and terribly distended with gas; the liver is at times covered with lymph. Sometimes there has been extensive gluing together of the abdominal viscera—liver, intestines, uterus, and omentum.

495. **Diagnosis.**—The student, on first beginning obstetric practice (as we have often observed), is very apt to think he has met with a case of peritonitis, when his patient is only suffering from after-pains or hysteralgia; and in some cases this is not to be wondered at. Some differentiating marks may, therefore, be jotted down.

PERITONITIS.	AFTER-PAINS.
1. Pain begins in a day or two—second or third day is a common time—that is, the time when the after-pains are subdued or ceasing.	1. Begin speedily after delivery, and usually cease in a day or two.
2. Uterine contractions are absent.	2. Co-exist with uterine contraction.
3. Pulse keeps high, and tends to increase.	3. Rarely quicken the pulse.
4. Pain and tenderness over hypogastrium, increased on pressure; constant and deepening.	4. Are severe at the time, but not much aggravated by pressure on hypergastrium; and they cease when the contraction subsides.
5. Opiates relieve the pain but little.	5. Are much soothed by opiates.
6. Great and hourly-increasing constitutional disturbance.	6. Create little constitutional disturbance.

Weid, or ephemeral fever, may mislead at times. Here the rigors are much more intense, and a profuse perspiration following causes an abatement of the symptoms. This fever is of shorter duration too, and the breasts do not become flaccid.

From metritis it is distinguished by the more acute pain on pressure; that is to say, in peritonitis the pressure of the bed-clothes, as we have seen, cannot be borne, whereas in the other disorder pressure can be tolerated until we go deep enough to touch the uterus.

496. **Treatment.**—The treatment of this malady must not be of a routine character; it ought to be shaped or adapted to the particular type. We may have one remedy for intermittent fever (viz., quinine), and one for gout (viz., colchicum); but, alas! for this grave disorder there is no

such reliable specific. When we look back fifty years to the epidemics which prevailed in different parts of this country, we find that the treatment consisted mainly of two remedies, viz., profuse bleeding, and no less liberal purgation; it was nothing if not freely antiphlogistic. Thus it was combated by the Gordons and the Campbells, the Armstrongs and the Heys. Twenty-four or forty ounces of blood were taken, and the frequency with which the patient was sent to stool would have delighted the soul of a Hamilton of strong cathartic memory. Now, we shall not condemn these gentlemen for so doing, for they appear to have saved many patients by this method of treatment; and, beside, the fever they had to deal with was of a highly inflammatory character, there being a full, a firm, corded pulse as a rule. We do certainly believe that these worthies, who toiled away in the middle of epidemics of this disease in the early quarter of this century, did right by thus bleeding; and that had a Bennett arrived amongst them, it would have been a positive misfortune. We say this without detracting from this eminent author, who has done a useful work. A hot fire raged; by phlebotomy they robbed it of fuel wherewith it would have blazed all the more fiercely and fatally. Shall we bleed as they did now? Yes, if we meet with the same full, corded, bounding pulse, which, however, is not very likely. When bleeding is required, it must be done early; so soon as the pulse and the pain point out that we have to deal with a peritonitis unmistakably. If more than twenty-four hours elapse, the time for bleeding is past. How withdraw the blood? Twelve to sixteen ounces, or so, by the lancet, and three or four dozen leeches on the abdomen. When these tumble off, light poultices or fomentations are to be applied. If the patient were not very strong, the lancet might be spared, and the leeches only applied; but these are not to be omitted. We believe that now-a-days we may do harm by abstaining from bleedings too often.

497. While moderate bleedings, then, are indubitably curative here, it is widely agreed also that purgatives are also an important remedy. Gordon and others had much faith in them. Among the symptoms of recovery (in addition to a slowing of the pulse, relief of the pain, subsidence of abdominal tumefaction, abundant milk, and lochia, with a gentle perspiration), diarrhœa coming on pretty early is one. It is believed, then, that the induction of this, when absent, is demanded. It should be attempted early, like the bleeding, and by purgatives that will not arouse tormina. A large dose of castor-oil, with 30 minims of tinct. op., will form a good beginning. Enemata of oil and warm water are also useful. The compound powder of jalap—40 to 60 grains, with 5 grains of pu. ipecac. comp.—is a very suitable laxative likewise.

Opium.—If camphor was made for women, opium was surely manufactured for peritonitis. Distinguished names endorse its magical power here. It should be given early, and in large doses, one grain every hour. There is a dispute whether mercury—calomel, that is to say—or opium does the more good. They were often given together, and then, of course, one could not say what credit was due to the one and what to the other. We have used opium by itself, and found a deal of good result in peritonitis, showing that it can achieve much single-handed. We would place it above the calomel. The latter, however, has also its fit place. It will not give the bowel repose, nor therefore the peritoneum, like opium; neither will it palliate the agonizing pain; but it helps to arrest inflammatory effusion. We would give 4 grains three times a day, watching its effects (physiological), and combining it with a little opium, just to prevent it draining away by the bowels. When the strength of the disease has concentrated itself on the liver, emetics have been of some service. Good is done by syringing the vagina and uterus with warm water, two or three times a day. We would add to the water some laudanum, and a little permanganate of potass or carbolic acid. When there is much gastric irritation, mace tea, ice, and draughts of citrate of magnesia are serviceable. The thirst may be allayed somewhat by dilute hydrochloric acid in water. Turpentine was tried in 4 to 6 drachm doses by the mouth, but it has not many advocates now. As a counter-irritant enema, it is of some service. Peppermint, nutmeg, anise, dill, and assafœtida help the tympanites. They may be given both by the mouth and rectum. We should say that we have used opium pessaries by the vagina, and morphia suppositories by the bowel, with advantage.

498. **Prophylactic Measures.—Maternity Hospitals, etc.**—If it is of the first importance to know how to combat this fatal malady when we meet with it, it is of equal, if not greater, concern to know how to prevent it. Though treatment can do but little here; though "no medicine, though it oft can cure, can always *balk* the tomb;" yet measures of various kinds can often defeat the advent of the disorder. We are not of those who believe that it can be made easily to disappear, but we have strong faith in its limitation. Let us notice the means peculiarly applicable to the auto-genetic first.

Auto-Genetic Cases.—These arise chiefly from the decomposition and absorption of uterine fluids, and the material from sloughing wounds, etc. Well, apply your disinfectants—your careful injections of permang. potass., and acid. carbolic., and water; place a screen of tenax on the vulva (don't pack the vagina, of course); and, above all, secure vigorous uterine contraction. It is your flabby, relaxing uterus that contributes to mischief; see and get it to contract, by ergot, if necessary. Have the uterus and soft parts been contused during labor? If so, secure rest, and use emollient applications and injections, and again, get the uterus to contract well. If there should be a little uterine pain only, don't be in a hurry with opium, at least, beyond a moderate dose; for it is of less importance to soothe the uneasiness arising from some bruising of the parts than to command vigorous uterine contraction, which the opium, largely given, would defeat.

499. **Hetero-Genetic Cases.**—These, as we noticed, are due to external infection, to influences brought to the puerperal woman when she is extremely susceptible to their inroad and action. Well, in the first place, the accoucheur must be scrupulously careful—that is, where a mixed practice is carried on—not to omit all possible precautions if he should happen to be attending scarlatina, or other zymotic disease. The fact is undeniable that no little metria has sprung, from time to time, from the sphere of general practice. Few will refuse to acknowledge this; many have lived to lament and deplore it. Dr. Hamilton says that he had known the matron of the Maternity convey it to patients in town by whom she had been employed. Dr. A. Gordon of Aberdeen says (p. 37 of his treatise on puerperal fever), "that it is a disagreeable declaration to make, but I myself was the means of carrying the infection to a great number of women." He gives a number of striking instances of its infectious nature. Here is one: "The servant of Sir William Forbes, Bart., carried the infection from his sister in Aberdeen to his wife in Fintray parish, a distance of six miles." Again, "The infection was

carried by accoucheurs from Aberdeen to Gilcomston and the Hardgate, villages in the suburbs; while women in the adjacent country, delivered by midwives residing on the spot, escaped." Other impressive facts are given, such as the immunity of the Old Town of Aberdeen, where all the cases were treated by a midwife, who had not visited any metria cases. Many more illustrations might be adduced, and from materials nearer home, but suffice it that we say that we know not a few medical men who have been convinced of having carried the infection, and who went into quarantine for several weeks.

500. The deduction from these facts, then, briefly is, that whenever we meet with a case in private practice, we ought either to retire for a period, or get thoroughly disinfected, The former is more than what many can manage, but the latter is within the reach of all. Clothing should be changed, the hands washed and disinfected, and if lying-in cases are to be seen after the fever one, hours spent in the fresh air should elapse before visiting them.

Further, what is true of this fever: the precautions demanded in connection with it are no less indispensable as regards scarlatina, erysipelas, and typhus. We have noticed the close, though somewhat occult, relationship subsisting between these and puerperal fever—that one or more of these may, at least, contribute to the production of the latter, and *vice versa*. Well, then, are we all scrupulously careful to cleanse and disinfect ourselves? or do we, pressed for time, it may be, rush, impure and reeking with the animal poison, from one patient to another? We know there are many brethren who are very careful, and who visit their lying-in women first, and their fever cases afterward; ay, who leave their erysipelas cases over, too. In charity, let us conclude that what is a clear duty for all of us is a universal custom. The plan may involve more labor; but it will cheat the grave of some spoil. And, what is more, we shall not have to deplore the doing of a wrong thing. Nay, on the contrary, we shall have the imperishable fee of a consciousness of having done the right thing, and what was demanded alike by justice and humanity.

There are other preventive measures, to be named in a sentence or two. It is a most tempting subject, but brevity is inevitable with us. Well, then, the student who is carrying out practical anatomy should not be permitted to engage in obstetric practice the same session. It is tacitly understood that he does not, but it is feared that it is occasionally done. That contagion comes of the dead as well as the living is sure.

Further, let us remark that the destruction, or at least the painstaking disinfection, of the apparel worn by the deceased is absolutely necessary.

501. Dr. Gordon and others believed even in the preventive power of physic. As purgatives did good to the malady, they fancied these might help to avert it. They, therefore, gave a laxative bolus the day after delivery, and laid the flattering unction to their souls that all those bolused who were not seized by the fever were protected by the bolus. Well, they are not to be sneered at. Quinine cures ague, and it is also believed to avert it. As bleeding was also highly curative, they thought it would be also highly preventive; but though they bolused, they did not bleed, and for this, to us, unsatisfactory reason, that should the phlebotomized woman be afterward seized (see Gordon's Treatise, p. 57), then the fit and effectual remedy (bleeding) could not be employed. We say unsatisfactory, for this reason: The bleeding was believed by these gentlemen to be preventive as well as curative; well, if it was not success-

fully prophylactic, it showed that it was too sparingly done, From this it followed that more bleeding could have been safely resorted to. The fact is this, however, that we would never sanction the lancet as a prophylactic; we would never dare to bleed a puerperal woman, simply because puerperal fever was going about in grim and ghastly guise, and she might possibly be smitten with it.

502. **Maternity Hospitals.**—These have been viewed by many distinguished authors as prone to foster, nay, generate, puerperal fever. Doubtless the malady has at times been brought to them, but oftener, we fear, it has been engendered within them. When it does appear in such institutions, it maintains a tenacious hold, and is unwilling to depart until decimation is effected. Frequently has it cleared out the building, and compelled to the turning of the door-key. But though this has been the case in the past, things need not, in our estimation, be so black in the future. These houses may be improved; they need not be swept out of existence. How improve them? Our own humble idea is this, that it can only be thoroughly done by engrafting upon them as much of the home arrangements as is possible and practicable. Place your building in the middle of a fine park, by all means, and let it be fanned by every bracing and purifying breeze that blows; let the rooms be ample, well lighted, and ventilated, and let every article of clothing, furniture, etc., be kept scrupulously clean. All that is requisite, nay, indispensable; but yet it falls short of what is necessary for safety. We would demand, as a *sine qua non*, a room exclusively for each patient, and *that* apartment communicating with the external air.

In addition to this, there should be separate houses for the purpose of receiving the patients of the Maternity from time to time, so that the latter might be efficiently ærated, cleansed, and fumigated. These "occasional houses"—[*gelegenheitshause*—are recommended by such authorities as Lange, Hecker, Schwarz, Rokitansky, Oppolzer, Skoda, and last, but not least, Virchow. These substitute houses for the relief of the Gebärhaus should also, like the latter, admit only one woman into each apartment, and be devoted solely to the reception of cases of puerperal fever as they might arise in the Maternity. We would lay immense stress on the one room for every single patient. If pecuniary considerations debarred it, then it would be better to shut up—to turn the door-key altogether. The transcendent value of the single room lies here: As we have noticed, the great authorities recommend occasional houses for purposes of isolation whenever a case breaks out. Well, if it breaks out in an apartment where there are six or a dozen more women, what is to prevent the subtle poison from invading and infecting these before you get the stricken one removed? You remove her early, you say. So far, good; but is the zymotic poison not a fast traveller? May it not wing its malignant flight with the swiftness of light?

503. We observe some excellent suggestions by Dr. Matthews Duncan, in his chapter on the construction of a maternity hospital (p. 166 of his work on the Mortality of Childbed, etc.) He recommends (1.) "An infirmary for puerperal fever cases in connection with every Maternity. (2.) That there should be always one half of the beds of a Maternity vacant, so as to admit of the occasional evacuation of the other half. (3.) When a case of puerperal fever has occurred, and the patient has been removed to the infirmary, the remaining women are to be placed in a sort of quarantine till their recovery, and the ward is to be entirely cleansed." The one-room plan we have suggested would save this necessity for

quarantine. (4.) "When an epidemic appears in the maternity, no new lying-in woman shall be admitted; and the institution is to be evacuated. The confined must not be shifted to other lying-in institutions. After evacuation, the building is to be carefully cleansed and disinfected, and not opened until the lapse of a month." There is another thing in connection with these institutions of paramount concern. They should not be near a general hospital, nor even close to a gynæcological ward or infirmary.

CHAPTER LIII.

PUERPERAL METRITIS, OR HYSTERITIS.

504. This form of puerperal disease—inflammation of the uterus—is not so common as the preceding malady. It is often a part of metria, and, indeed, is occasionally the chief thing found in the way of lesion in connection with it. It is not often found uncomplicated, however.

Causes.—Portion of placenta retained, and decomposing. Injury to uterus, from child in cases of distortion, or from forceps or other operative procedure. Cold, or injection of astringents, may excite it. Cruveilhier met with a gangrenous case thus induced. Atmospheric constitution. We lay much stress on this latter, although we would not join those who laugh at the repulsion and suppression of the lochia by cold as a cause. The lochia is necessary, or it is not. If not, why is it there so often? If it is, why, then, the suppression of it must be injurious. We have no doubt, at the same time, that its suppression may in some cases be an effect of incipient metritis, instead of a cause. We have a suitable analogy in the case of the mammæ, where suppuration results from lacteal arrestment.

Symptoms.—These are pretty much the same as in puerperal peritonitis, only there are a few distinctions, which we shall notice. The pulse is not quite so rapid, 100 to 110 being the average. As a rule, the lochial discharge is more limited here, and altered in character to fetidity or acridity. Dysuria is a more marked symptom. The uterus is felt to be more enlarged, and painful on deep pressure. The countenance is not commonly so anxious, pinched, or puckered as in peritonitis.

The inflammation may terminate in resolution, in softening, in abscess, or in gangrene.

505. **Diagnosis.**—The pain is more severe and persistent than in hysteralgia. From peritonitis it is distinguished, as before said, in this way. You may handle the belly all over in metritis without increasing the pain; whereas, in peritonitis, your gentlest manipulation cannot be tolerated. You elicit the pain in metritis only when you press deeply, so as to touch the uterus. There is a weaker pulse in metritis, and the lochial discharge is much more offensive. There is more intense heat and dryness of the skin, and the patient sinks more rapidly. In gangrenous metritis, however, it may be remarked, the progress is not so rapid, two or three weeks sometimes elapsing before its fatal end. Typhoid symptoms are more common in metritis than in peritonitis.

Prognosis.—When there is a very weak pulse, very offensive lochia, and disappearance of lacteal secretion, with low, typhoid symptoms, the patient is likely to succumb.

Morbid Appearances.—Increased vascularity of peritoneum. Enlargement of uterus, which is also soft and friable at times. Pus in the substance of the womb. "Sometimes," say Boivin and Duges (Dis. of Uterus, p. 320), "a purulent, viscous, but fluid deposit is spread over the uterus; at other times, false membranes, of some thickness, and large greenish flakes, compose of albumen or fibrine, are accumulated between this organ or bladder, or between it and the rectum. At other times, yellow, cheese-like concretions entirely cover the uterus, gluing it to the intestines. The natural, pale-rose color is changed into a yellowish-gray hue. False membranes are seen on the mucous membrane of the cavity of the uterus, mixed with blood and lochia. Extensive softening of the muscular substance is one of the most common results. Purulent collections are found, too, between the laminæ of the broad ligaments, and within the areolar pelvic tissue, and the substance of the ligament of the ovarian vessels."

Treatment.—Extensive leeching over abdomen and groins, afterward light poultices and fomentations. Opium largely, as in peritonitis, with one or two large doses of calomel, whenever the disease is suspected. Metritis has thus often been nipped in the bud. Purgation is inadmissible, beyond a mild intestinal action. Enemata of warm water, with laudanum, soothe. After the acute stage is past, blisters or iodine may be applied to the abdomen. Quinine internally, and liberal use of extract of meat, and wine.

CHAPTER LIV.

UTERINE PHLEBITIS, OR INFLAMMATION OF THE UTERINE VEINS.

506. Uterine phlebitis, with pus in the veins, is a very grave form of puerperal disease. It has been noticed by several authors, such as Meckel, Tonnelle, Dr. John Clarke (in his Essay on the Inflammatory and Febrile Diseases of Lying-in-Women), Burns, in his admirable work on Midwifery, and Dr. Robert Lee. This latter gentleman, by his investigations, has thrown much useful light on the subject. Dr. Lee was of opinion that puerperal fever was a consequence of this inflammation; but the opinion most generally entertained is, that phlebitis is simply part of a constitutional disorder—one of the manifestations of it—and not its cause. Puerperal fever has often killed, without leading to phlebitis.

Causes.—Zymotic influence, contagion, cold, mechanical injury of uterus, decomposed portions of placenta.

Symptoms.—Its inception is usually manifested by a severe rigor on the second or third day after delivery, accompanied by a uterine pain, and a great rise in the speed of the pulse. The pain extends to the back, hips, and thighs, and is aggravated on deep pressure, as well as when the patient moves. There is pain in the head, and there may be sickness and vomiting. The lochia become suppressed, the milk recedes, and the breasts get flaccid. The lochia occasionally is of the usual quantity, but altered in character, being fetid. There are some cases met with where there is little uterine pain. The perspirations are profuse, of peculiar odor, and exhausting; and diarrhœa often sets in. After a time the pulse becomes still more rapid (140 to 150), the tongue gets dry, and red or glazed, or brown; there is intense thirst, delirium, nausea, and vomiting of green or brown fluid. There is sometimes a hectic flush on the cheeks, and a dusky, yellowish hue on the skin. Severe rigors often recur. Tympanites sometimes arises, pressing on the diaphragm, and still further quickening the respiration, impeding cardiac action, and occasioning distressing hiccup. The patient may be carried off by the pain and exhaustion, the imperfect cardiac action, and respiration of the acute stage; but more frequently she survives, to be translated into the next, which is characterized by pyæmic phenomena.

507.—**Pyæmic Stage of Uterine Phlebitis: Septicæmia, etc.**—The investigations of MM. Schmiederberg and Bergmann led to the discovery of a crystalline substance in pus, which they termed "Sepsin," and which was found to possess in a high degree a decomposing and putrefying property. More recently Prof. H. Fischer, of Berlin, has devoted his attention to the subject, and he has detected other poisons in putrescent pus of a most active character. Some of these, moreover, are diffusable through membrane. He injected putrefying pus into rabbits subcutaneously, and found that a single drop produced fever, collapse, choleraic diarrhœa, albuminuria, and death within twenty-four hours. Liver, spleen, kidneys, etc., were inflamed immensely, and various other pathological changes occurred. There is no doubt, then, that pus, undergoing various changes, is a most active and deadly poison, and that its septic properties are enhanced when it becomes mixed with the blood. When phlebitis deepens into the pyæmic or pyogenic stage, we have an aggravation of the symptoms. There is a new poison, as it were, superadded to the toxæmia which occasioned the phlebitis, and the symptomatic phenomena are changed. These are physical and psychical. There is restless and profound anxiety, deep depression, sighing, moaning, and sometimes hysterical phenomena, which would lead one to fancy he had a case of puerperal mania to deal with. There are oft-recurring and severe rigors, profuse sweating, rapid pulse, præcordial oppression, and hurried respiration. The countenance becomes more pinched and haggard, and there is sometimes a dull and vacant, or a fixed and wild-like stare. Petechiæ or pustules, or erysipelatous blushes, may appear on the skin—the latter also being dusty-yellow—and a peculiar odor marks the sweat. The breath has a singular, sweetish, new-made-hay perfume. There are pains in the joints, hip, knee, and shoulder especially, and these are also tumefied. Suppuration may occur in the neighborhood of these, going on to sloughing, and even gangrene. These suppurations on the surface are, however, a kind of safety-valve. There are graver suppurations in the lungs, liver, kidneys, omentum, etc. The inflammation sometimes attacks the eye, destroying the cornea, and occasionally we have gastro-enteric ulceration. Pericarditis is also common. When death occurrs, it is usually owing to exhaustion and collapse, the antecedent symptoms being similar to the adynamic type of puerperal fever. When recovery happily takes place, it is often for a considerable time marred by sad sequelæ, such as immense debility, stiff anchylosed joints, and impaired vision or even blindness.

508. **Morbid Anatomy of Phlebitis.**—Dark-colored, extremely fluid, and imperfect coagulating blood. The clots when formed are soft, and

contract poorly, and the serum which escapes is turbid. Putridity sets in fast, or, rather, this has characterized the blood, even before death. In numerous organs, lungs, liver, spleen, kidneys, heart, etc., there are ecchymotic patches of a circular outline, and in their neighborhood are collections of pus. These congestive spots are a kind of half-way-house to suppuration; they are the first stage. Abscesses are more common in the lungs than the liver. Pus is common in the joints, and the cartilages are often ulcerated. The brain is frequently congested, and occasionally, but much more rarely, there is pus in its substance. The heart is enlarged or softened, and lymph or serum is found in the pericardium. The spleen is frequently soft, or even rotten, and the kidneys are also softened or covered with lymph, or contain deposits of pus. The uterine veins are contracted, their lining being thickened, and coated with lymph and pus.

509. **Treatment.**—The treatment of phlebitis resolves itself into two parts, viz., that of the primary disease, and that of the secondary affection. When we are convinced we have a case to deal with, we ought, soon after the pain begins, to leech extensively the abdomen, to give full doses of opium, and one or two large doses of calomel. Fomentations are also to be applied to the belly; ice and iced drinks, and internal antiseptics, such as sulphides of soda, potass, magnesia and lime, as recommended by Polli. Whenever the symptoms announce unmistakably the pyæmic stage, then there must be a truce to antiphlogistics, and immediate recourse had to a stimulant and restorative treatment—extract of meat, good whisky, or brandy and milk. As the constitutional disturbance may be great, small quantities of these only ought to be given at a time, and oft repeated; not forcing them upon an unwilling patient. The medicinal stimulant of most service is the aromatic spirits of ammonia; give it in fifteen or twenty minim doses every few hours. If the patient begin to recover, wine may be made to replace the brandy. Iced champagne is of much service where there is irritable stomach, and a tendency to reject aliment. There is a close relationship between putrid disorders and the liver; so the use of the cholagogues, such as podophyllin, taraxacum, and rhubarb, may be advantageous. The bowels are thus acted on too. The renal and cutaneous excretions should be well looked to, and gently stimulated. Polli's (of Milan) anti-putrefactive, anti-fermentative sulphites, and hypo-sulphites may be continued. Charcoal by the mouth helps a little in the antiseptic way; and it may be combined with bismuth if there is irritable stomach. It relieves troublesome eructations. Alkalies, such as bicarbonate of soda and potass, may be given to favor the oxidation, and consequent destruction of the putrid material in the blood. Carbonates are more potent in this way, but the stomach receives them less readily. For all external sores, we need hardly say that the Listerian method ought to have a fair field.

CHAPTER LV.

PHLEGMASIA DOLENS: CRURAL PHLEBITIS.

510. This affection has been called by different names; owing to the diverse views entertained respecting its nature: for example, œdema dolens, crural phlebitis, milk swelling, metastasis lactis, dépôt du lait, white leg, milk leg. Mauriceau was about the first to notice it more particularly, and Levret and others well described it, but their pathology was erroneous.

It consists of a diffused swelling of the lower extremity, colorless, and of a hard and elastic nature, and not pitting readily on pressure. The left leg is more commonly affected than the right. The leg is tender and painful, and there is a hot skin and quick pulse. It may begin before the sixth day, but the second week is a more common time; and its invasion may even be deferred to a longer period after labor. even a month or two. It has happened occasionally after abortions also. White, of Manchester, who wrote ably on this disorder at the end of last century, met with a case where it began twenty-four hours after labor; but this is as rare as Levret's case, which occurred at the end of a year. White thought that the side on which the woman lay during labor determined the side on which the disease appeared.

511. **Pathology.**—Mr. White believed the affection to be due to an obstruction of the lymphatics during parturition. Mr. Hull (Essay on P. Dolens) thought the proximate cause to be inflammation of the tissues of the affected leg, leading to an extensive throwing out of coagulable lymph, which effusion, he imagined, caused the great tumefaction and tension. Siebold, Albers, Boivin, and Duges hold that the nerves are first affected, and that the œdema is secondary to this. The pain, according to these authors, is a neuralgia. The theory now generally held is, that the affection is due to an inflammation and obstruction of the crural veins; that the disorder, is, in fact, a crural phlebitis. To whom belongs this discovery? It is not quite clear. Just as the discovery of the coexistence of albumen with puerperal œdema and uræmia is shared by Simpson and Lever, so here the detection of the true pathology is divided between the late able Professor Davis, of London, and M. Bouillaud. Both discovered it about fifty years ago, independent of each other; but the Frenchman was the first to publish it.

This subject cannot be named without the casting up of the name of the venerable and able Robert Lee. He has written admirably on the subject in his work on the Theory and Practice of Midwifery, and given cases and dissections. Dr. Lee's theory is that it is a crural phlebitis, but he holds that the inflammation begins first in the uterine veins, and then extends to the iliac and crural veins, the veins of the vagina, saphena, etc.

Virchow's Theory.—This eminent pathologist has made numerous dissections, and concludes that the first step consists in the production of a clot in the vein. This blocks up the vessel, and causes inflammation, effusion of lymph, and the formation of pus; all the after phenomena, in fact, spring from this stoppage.

Dr. T. W. M'Kenzie, of London, has treated of its pathology in a monograph, published in 1862. He thinks the phlebitis due to a morbific condition of the blood. We incline rather to Dr. Lee's view. Morbid states of the blood, in the puerperal condition, rather conduce to thinness and non-coagulability. The most plausible view, then, is that inflammation of the internal coat of the vein is the starting-point, then plugging by clot and its concomitants follow. The obstructing clot may be coagulated lymph, or fibrine, or pus. The swelling of the limb is due to engorgement, with serous effusion. In addition to the crural veins, the uterine, iliac, vaginal, saphena, and vena cava may be affected. The lymphatics and nerves of the limb are frequently inflamed also.

Causes.—We are inclined to think that a tedious labor, with the head pressing long on the soft parts, predisposes to it. Other causes named are damp, cold, instrumental injury, artificial extraction of the placenta, getting up too early after delivery.

512. **Symptoms.**—The intitial symptoms are often a rigor, then pain along the pelvic brim. The pain is not always of the same character; it is at one time acute, another dull, and varies also in depth. Its site differs too. Frequently it is felt first as a lancinating pain along the calf of the leg, in the course of the lymphatics, along the inner part of the thigh, up to the groin, where a tension and soreness begin to be felt. The woman is often weak and irritable. Frequently the pain is at first believed to be rheumatic. After pain has set in, swelling is not long in following; twenty-four to forty-eight hours is a common time. Tumefaction often begins at the groin and travels downward; but it may begin at the calf of the leg, or where the pain was first felt. It brings not the roseate hue of inflammation; on the contrary, the limb is of a pale and shining aspect, just like a membranous, glistening bag distended with milk. In some instances, the limb from foot to thigh, and above this to the groin, is enormously swollen, and the nates and vulva share in the enlargement. Owing to the extreme tension, there is little, if any, pitting on pressure, though before this, and after the acute stage, the indentation remains for a little. When the swelling has involved the thigh, the femoral vein may be felt rolling, cord-like, under the finger. There is increased pain on moving the limb.

The constitutional symptoms are quick pulse (120 to 140), thirst, furred tongue, headache, restlessness, irritable temper. The milk is often suppressed, and frequently there are profuse perspirations.

Course and Termination.—(1.) The swelling begins to subside in two or four weeks, but many more elapse before it is of its former dimensions. It also remains very stiff, with little sensation or power of motion, for a considerable time. (2.) The affection may follow a less favorable course, going on, in fact, to suppuration. There was a case reported by Dr. Murray, to the Edin. Obstet. Soc. in April, 1863, where this result followed. "There was a pint of pus in the knee-joint, ulceration of cartilages, hip-joint cartilages gone, caries of the condyles of the femur." She was delivered on the 22d of December, and died on the 15th of March following. (3.) Death may occur suddenly, or more gradually from exhaustion. When sudden, it is in all likelihood due to embolism; for a clot may not only be carried to the pulmonary vein from the uterus, but, beside, there is a tendency to coagulation in other veins. As a rule, if well managed, and the female has not a bad constitution, this affection is not very serious.

513. **Treatment.**—Bleeding is not to be recommended unless there is great plethora, when a dozen leeches may be applied over the femoral

vein and on the groin, followed by warm fomentations. A saline purgative or two at the outset should be given. Elevate the leg, and apply cloths steeped in the acetate of lead, and opium lotion warmed. Relieve pain, secure rest, and promote diaphoresis by opium and ipecacuanha; the pulv. ipecac. co., in 5-grain doses, four times a day, will answer well. Stimulate the kidneys by sweet spirits of nitre, or the inhalation of oil of juniper. Place a cradle over the limb to keep off the bedclothes. Slight punctures, recommended by some, appear not to give much relief. Frequent vesication with small blisters does more good. Gentle friction—rubbing from below upward, with the following liniment, is markedly beneficial: Tinct. opii., 1 ounce; tinct. cantharides, 2 drachms: tinct. arnicæ and tinct. camphor, of each, half an ounce; olive oil to make up to 6 ounces: mix and shake. This may be applied three times a day. Moderate support may be rendered, when the swelling has gone *so* far down, by means of a flannel bandage. Quinine will form a highly suitable tonic, and a restorative regimen should be adopted. Mercurial inunction has its advocates, and helps to reduce tumefaction.

CHAPTER LVI.

EPHEMERAL FEVER OR WEID.

514. This is a short-lived fever, common chiefly to women living in a damp dwelling, or those of a sensitive turn. A chill, fatigue, or mental depression may also give rise to it. It is a kind of miniature ague.

Symptoms.—Intense and protracted shivering (beginning from the third to the sixth day), accompanied by back-pain, headache. pains in the limbs, shrivelled features, dry and rough skin, quick and irregular pulse. The eyes are sunken, and there is considerable mental depression. The temperature of the skin may be increased, yet the patient feels as cold as ice. Sometimes pain is felt in the breasts, at other times over the uterus. As the shivering begins to moderate, the heat of skin increases, the frontal headache is intensified, the face gets flushed, and sometimes there is slight delirium. The pulse becomes harder, the tongue gets furred, and the various secretions, lacteal, lochial, and renal, may be for a time arrested. The woman sometimes becomes despondent, and apprehensive of serious results. By and by, the intense heat—the dry, hot stage—ceases, and a profuse perspiration breaks out with the happiest results. The breathing grows less oppressed; the pulse slows and softens; the tongue moistens; the headache vanishes, and the temples cease to throb; the different secretions are resumed; the mental perturbation is at an end; and the patient falls into a tranquil sleep. On awaking, she may be quite well, with the exception of having parted with some strength. The entire fit (cold, hot, and sweating stages) is usually over within 24 or 48 hours. Unless there be atmospheric causes —miasmatic surroundings—this little ague is not likely to persist, but passes finally away. Some cases, however, according to Dr. Ramsbotham, have deepened into a settled intermittent. Dr. Burns, in his work, also says that a continued and troublesome fever may result, unless care be taken.

515. *Diagnosis.*—The commencement of it may puzzle a little, and suggest a puerperal fever case, for indeed there is no telling at once where mischief may not alight. Soon, however, it will be found that pain is more in the head than in the belly; indeed, there may be no uterine pain at all. The intensity and suddenness of the rigors, and the other stages, too, with the irregular character of the pulse, help to differentiate it.

Treatment.—Quantities of hot bottles or bricks to the feet, thighs, and axillæ, and diaphoretics, such as liq. ammon. acetat., ipecacuanha, and warm gruel. Into this gruel we would mix a drachm of sweet spirits of nitre—it will promote both the cutaneous and renal secretion. We are surprised that authors, while viewing this as akin to ague, do not recommend quinine. We give a large dose at once whenever we meet with a severe rigor in the puerperal state. It is the sheet-anchor not only in intermittent fever, but in all rigors. It cuts them short, and prevents their return. If you are afraid of this little ague drifting into a big one, or into a continued kind of fever, saturate and permeate the woman with the quinine. It will not aggravate the headache, while breaking up in some occult way the weid, and upsetting the subjective and other conditions which favor a return.

CHAPTER LVII.

PUERPERAL MANIA.

516. This sad complication of the puerperal state may happen during gestation, soon after labor, or after the lapse of weeks. It often occurs, too, in the course of a prolonged lactation. It is probably most liable to arise soon after the shock of labor, or when the strength has been impaired by a long course of nursing.

Ephemeral Mania.—Before considering the more grave overthrow of reason, we shall notice in a line or two a short-lived seizure which occurs when the fœtal head is pressing on the os, or in that marked sphere of peripheral irritation, the vagina. The late Dr. Montgomery first described this frenzy—for mania it can hardly be called, as Ramsbotham observes. It is a very brief aberration, due to the excitement produced by intense agony. There is some little wandering of the mind, and incoherence, but it is over in a few minutes, and the woman, instead of being oblivious of it, recollects and apologizes for any impropriety of which she may have been guilty.

517. **Puerperal Mania Proper.**—This form of insanity is no means rare. There are not many practitioners of experience who have not had to deal with one or more cases of the disorder. There are two forms usually met with—the one characterized by delirium and furious excitement, the other by a low melancholy. The former sets in somewhat suddenly, and not long after labor. The melancholic form is later in appearing, and it creeps on more gradually and stealthily. The maniacal form is most common, happening twice as frequently as the melancholic. A singular feature has been pointed out in connection with insanity in the puerperal state, and with it alone, viz., the consciousness on the part

of the female that she is erratic and under delusions. We have met with females who indulged in the most outrageous speech and the grossest incoherency, and who yet were cognizant of their deviation. Gooch, in his work on Diseases of Women, states that he has seen cases where there were many features similar to those characterizing *delirium tremens*. He has also known catalepsy happen in the course of the affection. We have said that the women are sometimes aware of their unreason and proneness to delusions, and we shall just give an illustration from a case which occurred in our own practice recently. On entering the apartment where the insane woman was, she would sometimes say, "You had better take care, doctor, for I have an inclination to attack you." At another time she said, while holding a nursing cup in her hand, "Doctor, if you don't get out of the way, I must throw this at your head. I must do it; I can't help it." Then she would refer to some imaginary being staring at her, and suggest that she was probably wrong in surmising that any one thus took notice of her.

518. The duration of puerperal insanity varies. Sometimes the affliction will pass off soon; at other times it abides for months or years. The low melancholic form drags on its melancholy career much longer, as a rule, than the more violent and highly excited variety. The cases most speedily fatal are those where there is rapid pulse, high excitement, sleeplessness, and a strong feverish condition altogether. There is one cheering thing connected with it, viz., that permanent mania very rarely results. The dark cloud has thus a silver lining. In cases where chronic mania did come to pass, there was a history of antecedent aberration, as a rule.

Dr. Tuke, Edinburgh, has treated ably of this subject. (See Edin. Med. Jour., June, 1867.) He says that the form occurring during gestation is usually melancholy, with more or less of moral perversion. In puerperal insanity, on the contrary, out of seventy-three cases, no fewer than fifty-seven were acute mania, the rest being melancholia and dementia. In the insanity of lactation, melancholia is fully more common than mania.

Question of a Recurrence of the Mania.—The friends of the patient are naturally curious, or rather anxious, to know whether, on the occasion of a future labor, the mania may or may not return. Dr. Gooch was of opinion that a recurrence need not be anticipated, but we cannot share his opinion, we regret to say. We have met with a case or two where it has happened more than once. We are never safe to predict, then, either the one way or the other.

519. *Pathology.*—This is uncertain and unsettled. It is held by some that there is no cerebral or meningeal irritation, but that the cause is probably a shattered condition of the nervous system from exhaustion and suffering, or morbid (leucocythæmic) condition of the blood.

Causes.—Mental emotions of various kinds, operating on a nervous system unduly excited by labor and the requirements of the puerperal state. Sensitive females with a finely-organized nervous system are more predisposed to it. Hereditary disposition has to do with many cases. Emotions and passions of various kinds, we have said, tend to excite; other exciting causes may be gastric, hepatic, or intestinal disorder, hemorrhage, protracted nursing, leading to anæmia, uterine irritation. A piece of bad news brought to the woman may be sufficient to excite it. The last case we saw was apparently thus caused—the announcement of her father's sudden death being made to the woman a few days after labor. During the revolutionary periods in France, terror occasioned a number of cases.

Dr. Tuke has pointed out that the melancholia of the puerperal state is often but a further devolopment of morbid depression during gestation. Many females are partially insane at that time, having singular changes of temper, morbid appetite, and strange longings and cravings. Some have strong delusions and aversions, and actual insanity may supervene, with moral perversion and melancholia.

520. **Symptoms.**—These are divided into two varieties—those indicating melancholia, and those pertaining to mania. In mania, the woman is restless, agitated, anxious, irritable, suspicious, angry, noisy, incoherent, obstinate, outrageously impatient, vacillating, and contradictory. A mere trifle will send her into a paroxysm of rage, and she will break out into a perfect torrent of incoherent, and mayhap indecent, language, threatening, if not inflicting, violence on those around her at the same time. She has hallucinations of vision; fancies she sees certain objects; and these, again, excite her wrath, and she may express it in the form of cursing and swearing. A word dropped by the nurse, or perhaps by her husband, inflames her, and affords a new text for her resumption of furiously angry discourse and threats of violence. Sometimes she will lie still on her back, muttering incoherencies; at other times she will start wildly up, and want to get out of bed or out of the room, and will be with difficulty restrained. She is often characteristically obscene and lascivious. Suicide is frequently attempted; but, as pointed out by writers on mental disease, there is no premeditated desire to do so: the attempt springs from a sudden impulse. Masturbation has sometimes been observed, but it is believed to be in response to strong irritation. A peculiar restlessness of the eye is also a marked feature. It is common to hate her child, and attempt to destroy it. The physical signs and symptoms are the very antipodes of the mental characteristics. From all this outrageous violence one would naturally infer Herculean qualities. On the contrary, however, there is a pinched and feeble appearance about her; the pulse is small, irritable, and rapid; and she is pale, chilled-looking, and bathed in a clammy sweat. While these are the usual physical symptoms, it has been shown by Drs. Tuke and Bucknill, in their Psychological Medicine, p. 259, that there is a class of cases where there is an inflammatory pulse. These cases occur, often synchronous with the production of the milk, on the third or fourth day. This state of the pulse is ominous, as indicating inflammation of some internal organ.

521. **Symptoms of Melancholia.**—This form, as before observed, is the common insanity of lactation, as well as of the pregnant period. It creeps on sometimes gradually. The women suffering from it are anæmic; sometimes they have bronchocele, or it may be exopthalmia, and palpitation. Hysterical phenomena also mark them. They become suspicious of their nearest friends ; they hate their husband, and even their offspring. They will often not look at the infant; they are utterly indifferent to it, and it is not safe to leave it beside them. Great depression, terror, apprehension, are experienced; and often the woman is vastly concerned about her present spiritual state and future prospects in that way. She is sleepless by night and by day. She sits quietly, often in one position, perfectly indifferent to external concerns, and more like an automation than a human being. She does not ask for food, although she may not reject it; at times, however, she will resist food obstinately. She may not respond to other calls of nature. While not usually violent to others,

she is often disposed to inflict self injury; she is, in short, suicidal. She may answer questions pretty rationally, and obey requests. In this form of insanity there is sometimes a pale, sunken countenance; but the pulse is not much quickened, and the temperature of the skin, if not normal, is just a little lowered. Here there is not the tendency to lasciviousness or obscenity.

522. **Diagnosis.**—Puerperal mania may be confounded with phrenitis; but in the latter we have a rapid, hard pulse, hot skin, suffused eyes, and intolerance of sound and light. The expert in psychology can pretty readily make out a case of puerperal mania. Dr. Gooch was of opinion that no physician, by simply witnessing and examining a patient (that is, apart from any history of the case), could say whether it was a case of puerperal insanity or not; but the antagonism between the physical symptoms and the mental peculiarities affords materials for a pretty easy differential diagnosis.

Prognosis.—Esquirol, Burrows, Tuke, Bucknill, and others testify to the ready curability of puerperal mania, pure and uncomplicated. It is when internal organic disease co-exists that the prospect is clouded and doubtful. The presence of tuberculosis or of visceral disease is unfavorable. A rapid, inflammatory pulse, and great restlessness setting in early, look bad. The ordinary duration of the disorder is from one to six months.

Here we take the liberty of transcribing from the article of Dr. Tuke some valuable conclusions he has arrived at on this important subject. These are drawn from the records of a large number of cases in the Edinburgh Asylum, Morningside. They are as follow:

"1st. That an increase of liability to insanity exists between the ages of thirty and forty in child-bearing women, and that first confinements occurring at that period are peculiarly frequently followed by true puerperal insanity.

"2d. That primiparæ are more commonly the subjects of the insanity of pregnancy and puerperal insanity than multiparæ.

"3d. That the insanity of pregnancy in the majority of cases is developed during the 3d, 5th, or 7th months.

"4th. That the insanity of pregnancy is generally evidenced by melancholia or moral perversion, and that it is very curable.

"5th. That the hereditary tendency is peculiarly traceable in these three forms of insanity, and that in a large proportion of cases it exists on the female side of the family.

"6th. That puerperal insanity leaves a tendency to other forms of insanity.

"7th. That the puerperal insanity characterized by melancholia rarely commences until nearly a month after labor.

"8th. That a tendency to suicide is a very frequent symptom.

"9th. That complicated labors are more frequently followed by puerperal insanity than natural ones.

"10th. That cases of puerperal insanity, in which acute mania is the leading symptom, are more amenable to treatment than those in which melancholia exists.

"11th. That the insanity of lactation does not ensue on the first nursing so frequently as on subsequent ones; and the longer the child is kept to the breast the liability necessarily increases.

"12th. That the insanity of lactation is more transient than either of the other forms; and that where evidenced by acute mania, is less persistent than where melancholia exists.

"13th. That delusions as to personal identity are very common symptoms in the three forms of insanity.

"14th. That none of these forms of insanity are of themselves very fatal, except when complicated with other, and especially inflammatory, diseases. That they are all very amenable to treatment when such treatment is adopted early, and that the longer the patient is deprived of the benefits of an asylum, the chances of recovery decrease.

"15th. That this type of disease was anæmia in these three forms of insanity, which indicated the administration of a highly-nourishing diet, but a very cautious use of stimulants.

"16th. That the exhibition of narcotics is not beneficial where the leading symptom is acute mania."

523. **Treatment.**—The treatment is not on any account to be routine. The plan formerly adopted of shaving the head, then applying ice, purging, blistering, and administering antimony, is now fairly exploded. Under this antiphlogistic method the victim drifted into dementia; maniacs merged into dements. Shall we bleed in mania? As a rule, No; because violent muscular effort does not necessarily indicate vital power or strength. Bleeding would only debilitate, and thus retard recovery. What about opium? A large dose at the *very* onset may do good; but afterward, while it may moderate violence a little, it is believed to be hurtful, as tending to prolong the maniacal period. A cholagogue and aperient are useful, but strong purgation is hurtful. If opium is bad, is there no other calmative that would do good? We believe there is, and that we have it in the bromide of potassium. Give 60 grains five or six times a day, in water. It is calmative and soporific, and at times will act like a charm. There has lately been found a more potent one, however, and, so far as is yet known, very useful in this mania, viz., chloral hydrate. Many have found it invaluable in procuring the great indispensable—sleep. A sound sleep, as is well known, is, in this malady, far above rubies. The chloral has in numerous cases procured it without after-ill. It will take a deservedly high place, then, in this distressing malady. It should be given in a pretty full dose—40 to 60 grains. Much good is done by small quantities of nourishing food, frequently repeated—beef-tea, or extract of meat. To nourish is more than half the cure. There is often immense difficulty in getting them fed, owing to their resisting it obstinately. One may have to force the jaws open, or feed through the nostrils by a tube. A steady, kind, yet firm nurse, one who will remain well beside the patient, and attend closely to her necessities and wants, is of first-rate importance. We may add, that if the chloral fails in one or two doses to procure sleep, it should be desisted from.

Convalesence may be furthered by tonics, such as quinine, and change of air. Either the patient should be removed, or her friends; for the sight of familiar objects, far from being agreeable, only aggravates the malady, and stirs thoughts and ideas which bewilder or exasperate. The presence of child, husband, or friends is also hurtful. When convalescent, employment, carefully regulated, and adapted to the tastes and habits of the woman, will prove beneficial. But as an enfeebled body is incapable of much physical toil, so a weakened and still toppling intellect is inadequate to any great effort. The pursuit should, therefore, be agreeable and light. A too speedy return home has often led to a relapse.

524. **Risks and Disadvantages of Chloral.**—Here would seem quite an appropriate place for noticing, briefly, some of the disadvantages attending the use of chloral. We are not acquainted with any drug that can boast of unmixed triumph. Opium, while satisfactorily soothing pain, etc., is prone to constipate and induce headache and other evils; and astrigents, such as acetate of lead, pernitrate of iron, while curing a diarrhœa effectually, occasion gastric irritation and pain. Colchicum, also, while curing gout, entails intestinal irritation and cardiac depression; and arsenic, while exorcising the elements on which chronic cutaneous diseases are based and fed, gives us burning pain along the alimentary tract, and various other evils. It would be a perfect wonder, then, if chloral should stand alone as the only medicine that wrought unqualified good. We have not, however, seen serious evil produced by it, when carefully administered, and we have now prescribed it pretty often in suitable cases. We say suitable cases, because we are well aware that there has been a tendency to give it in the most diverse, and therefore often unsuitable, circumstances. The most common result which we have observed has been the flushing (a dull scarlet hue) of the face, neck, and ears, not unlike that produced by the nitrite of amyl (though more slowly) and conjunctival injection, due to vaso-motor paralysis. Sometimes an eruption like urticaria is induced, and in one case we have met with a roseola that could be apparently fathered only on this drug. The pupil becomes contracted under its continuous employment; and the action of the heart is weakened somewhat. We observe in the *Lancet* for April 1 and 8 of this year, that Dr. J. Crichton Browne, of the West Riding Asylum (a gentleman well versed in mental diseases, and the son of a worthy expert in psychological medicine), has called attention to some of the evils arising from the exhibition of chloral, which we have been considering. Dr. Browne points out this vaso-motor paralysis as one of the results, and says that he has also seen fatal blood-poisoning follow its employment. He details a case of purpura, in particular, induced by it, and where there was a "tendency to somnolence, weakness, and irritability of the pulse," denudation of the mucous membrane of the mouth, and a fissured and thickly-coated tongue. Pulmonary congestion set in, and the patient sank. He believes it to have an influence on cardiac innervation, and that its repeated use paralyzes the action of the heart. Cerebral congestion has been observed in some instances, but this was where an overdose had been given. When used by the subcutaneous plan, it has a greater tendency to produce sloughing than morphia.

CHAPTER LVIII.

PELVIC CELLULITIS: PERI-UTERINE INFLAMMATION.

525. This is an affection of no little importance, not only as occurring pretty frequently, but also as inflicting protracted suffering on the female in many cases. It consists of the effusion of various products, sometimes going on to pus, around the exterior of the uterus and ovaries. The initial stages are often obscure; the affection creeps on surrepti-

tiously, and, until a considerable effusion has taken place, there may not be symptons notable enough engendered to arrest the attention of the woman, or her physician. No doubt there are numerous cases where the effusion goes on to a certain extent, and then recedes, without enkindling very much distress. At other times this is far from being the case, prolonged suffering, and serious results being occasioned.

Pathology.—There has been no little difference of opinion with reference to the seat and nature, and consequent fit appellation, of this affection. We believe that it is in some cases an inflammation of the cellular tissue surrounding the pelvis; in others, that it is an inflammation of the peritoneum covering the fimbriæ of the oviducts, and the ovarian pouch —a pelvi-peritonitis. This latter is the view entertained by Bernutz, and Goupil, and others. The effusion does not go on to pus in many cases; sometimes it is serous, and occasionally an ugly, dirty-brown serum. The areolar tissue anywhere contiguous to the uterus may be attacked, but a very common site is that contained within the folds of the broad ligament. Often the starting-point is the ovary or oviduct. The inflammation extends frequently from the uterine appendages to the peritoneum lining the pelvis, and adhesions result at times between the intestines and these appendages, matting them together. Collections of pus form frequently, and eat their way out in different directions, the particular channel and place of exit depending on the site of the abscess.

526. König's experiments (see Archive für Heilkunde, 1862, No. 6, p. 481) with air or water injections into the areola tissue of the broad ligament, are deeply interesting and suggestive in connection with this subject. He found (1.) "That exudation into the areolar tissue in the neighborhood of the tubes and the ovary travels primarily along the course of the psoas and iliacus, and then enters the pelvis proper. (2.) Exudations starting from the antero-lateral part of the areolar tissue, where the cervix uteri joins the body, fill the cellular tissue of the true pelvis laterally, in the first place, to the uterus and bladder, then pass with the round ligament toward the ligament of Poupart, thence to the iliac fossa externally and backward. (3.) When the exudation begins at the posterior part of the base of the lateral ligament, the parts first filled are the posterior and lateral parts of the pelvis—viz., Douglas's space." In the few cases which we have met with, there was a discharge of pus by the vagina and rectum. In one tedious case the areola tissue situated between the peritoneum and abdominal muscles was invaded, and ultimately we had to make an opening on the lower part of the abdomen. Pirogoff calls this an "acute purulent" œdema; and Virchow terms it parametritis. Matthews Duncan has made various contributions to the subject, and embodied these in a work which may be pondered with profit. Dr. Duncan views the affection as most commonly a pelvic-peritonitis.

Causes.—Parturition has much to do in reference to causation here. In nearly all our own cases, labor was a close antecedent, and, therefore, doubtless a cause. The labors were not artificially aided, moreover, although, on the whole, tedious. Perhaps all of them were strumous females. Dr. West has given a table, in his able work, wherein it will be found that of 59 cases of this disorder, 32 happened after delivery, 11 after abortion, the remaining 16 being due to other causes. These may be introduction of sound, or bougie, or tents into the uterus. We have met with cases where it occured after the introduction of tents. Malignant disease of the uterus may enkindle it also, but it usually occurs after parturition, or from some other irritation of the uterus.

527. **Symptoms.**—An enlargement, or an induration, of some part of the lower abdominal region (accompanied, it may or may not be, with tenderness and pain), is often the first sign of the affection. At other times there are rigors, or febrile symptoms, with a quickened pulse, and obscure, dull, deep-seated pains. The patient may be progressing well after labor for a week or two, when, unexpectedly, chills occur, and she feels exhausted, and looks haggard, careworn, and anxious. She loses any little appetite she may have acquired after the ordeal of parturition, and fat seems suddenly to disappear. By and by come the significant indications—difficult and painful micturation and defæcation. There may be an external tumor or not; this depends on site. If the parts contained between the broad ligaments are the sphere of the inflammation, then there will be more or less of external bulging; but if down about Douglas's space, or in the areola tissue between the uterus and bladder, this will be absent. If the case goes on pretty severely, there will be much constitutional disturbance, rigors, severe neuralgic pains, strong fever, with nocturnal exacerbations, profuse sweating, and diarrhœa. At least, these effects occur in many cases. With regard to the neuralgia, König has remarked that the external cutaneous nerve of the thigh is the one most commonly affected. Extension of the thigh is attended with difficulty and pain, hence it is usually flexed on the trunk. It is the effusion round the psoas muscle that is the cause of this. This is viewed as almost pathognomonic. On examining per vaginum, we find the canal hot and dry, hardened and thickened, and we may detect above it a tumor of a hard nature. At first this tumor is of a very hard character indeed, although, further on, it may soften, or recede. In some cases we detect fullness in one or the other iliac region, and upon percussion the sound elicited is dull. When pus is formed, which is often the case pretty speedily, there does not seem to be any increase of pain in many instances, and females seek relief because the pressure of the effusion on the bladder or rectum has interfered with the due performance of the functions of these organs. We had a case where matter lodged for about six months without causing great inconvenience, when it discharged in a considerable quantity through the rectum. For a long time afterward, pus continued to flow by this channel. Abscesses of a chronic character like this, and even of much longer duration, are reported by Dr. West in his very able Work on diseases of women, and by Sir James Simpson, in his obstetric Works.

The latter has recorded examples where these have led to fistulous communications by the bladder, uterus, and bowel. Dr. M'Clintock has given some invaluable facts in regard to this affection. He found that in 70 cases, connected with the puerperal state, 37 ended in suppuration, with discharge of pus; 24 of these burst, or were opened externally; 20 in the iliac region, 6 by the vagina, 5 by the anus; while 2 burst in the bladder. In not one of these did the abscess burst into the peritonal cavity.

528. **Treatment.**—There is good reason to believe that incipient cellulitis may be aborted by early antiphlogistic treatment. When there is fullness and induration, tenderness and pain, in one or other iliac region, a dozen leeches should be applied, and a saline purgative given. This should be followed by an opiate, because it will sooth any pain that may exist, and help to arrest effusion. One good dose of calomel at

the outset will also help to lay an embargo on effusion. Highly nutritious diet should be given early, with wine and other stimulants. Perfect rest should be secured for the woman. Position has much to do with comfort, at least. Dr. Graily Hewitt advises the lower extremity to be laid on a double inclined plane, with the heel elevated; this removes tension from the psoas and iliacus muscles, and ministers to ease. (See Diseases of Women, 2d. ed., p. 490.) We observe that Dr. Hewitt (whose therapeutics, we may remark, in general, corresponds well with our own) puts in a strong word against mercury in this affection. Now, we think the doctor, like too many more, has missed the true function of mercury here. Mercury plays a most invaluable and unrivalled part before the affection has gone on to pus; indeed, it often averts its formation. For reducing induration, for making the hardness of an incipient cellulitis recede, there is no remedy equal to it. This softening power is seen, too, in hard chancre. How does it act? It promotes the absorption of, and checks further effusion. And not very much is needed either; five to ten grains at the outset may do it. If that should salivate, it can't be helped; better fluid gushing from the mouth than cooped up in the belly; confined in a very important locality, and no saying when or where it may escape. But while calomel is highly valuable before pus, and as a means of averting it, it is injurious after it has been produced. We will join any man in condemning it *then*, because then is the stage when the system must be upheld, and mercury is a down-breaker—that is, when largely used. Beside, the time is past when it could be of use; for while it often prevents the earlier effusion from going on to pus, it cannot further the absorption of the latter. From drifting into a foolish hydrargo-phobia, however, let us strive hard to be delivered.

CHAPTER LIX.

UTERINE HEMATOCELE.

529. This affection has been variously termed, such as peri-uterine hematocele, pelvic hematocele, and pelvic hematoma. It consists of an effusion of blood (bloody tumor) in some part contiguous to the uterus, the most common site being Douglas's space. It being so often found in this locality has led to its now common designation, retro-uterine hematocele. The precise seat of the collection of blood has occasioned much contrariety amongst authors, but the preponderance of testimony is in favor of the view that it is in the peritoneal cavity. Autopsies, of which there have now been many, almost always showed it to be intra-peritoneal; and reports of extra-peritoneal cases are remarkably few indeed. That these latter occasionally happen, however, must be conceded. It is passing strange that the exposition of the malady only dates about twenty years back. It is by no means a very rare disorder, and must have been casting up now and then in the practice of our ancestors; yet we find little attention being bestowed upon it until the period we have referred to, which is close on the time when anæsthesia was first strongly stirring the professional mind. Among those who have contributed to

its elucidation are Nélaton, Bernutz, Aran, Virchow, Voisin, Simpson Matthews Duncan, Wade, and Tuckwell.

530. **Pathology.**—In the intra-peritoneal form, blood, either from some pelvic vessel, or from the rupture of a congested—apoplectic—ovary, or the fimbriated extremity of the Fallopian tube, passes into the peritoneal cavity, and gravitates into the *cul de sac* between the rectum and uterus, forming a tumor which presses the womb forward and upward. The amount of blood varies; but occasionally sufficient has been effused to destroy the female at once. Usually, however, it is more limited in amount, and when poured out, coagulates quickly. Inflammatory conditions are then excited, and a sac is formed, in part by false membrane, and in part by the adhesion of the coils of intestine to the uterine appendages, and to each other. Sometimes the blood is not encysted, but free. Virchow's theory (Die Krankhaften Geschwülste, vol. i., p. 152) is this: "that the blood is commonly derived almost, if not altogether, from the newly-formed vessels of false membrane produced by previous pelvic peritonitis." This eminent pathologist, then, is of opinion that it is usually the offspring of an antecedent pelvic peritonitis. Scanzoni thinks the blood is of tubal origin.

The extra-peritoneal form has been viewed by some as a "thrombus," analogous to what occurs in the vulva, or to cephalhematoma, etc. Others term it a peri-uterine hematocele. This latter is the more suitable title.

The seat of the effusion here may be the areolar tissue around the uterus and ovaries, between the two layers of peritoneum forming the broad ligaments, or amid the pelvic viscera in general. The position and form of the tumor, it is obvious, will vary according to the locality, and the amount of blood effused.

We are helped in our estimate of the size of the tumor by measuring the uterus by means of the sound. This organ is usually elongated when the tumor is large.

531. **Causes.**—These are various. Sometimes the case can be traced to a chill caught during menstruation, and leading to the suppression of the discharge; at other times there has been a history of dysmenorrhœa, or of irregular menstruation, or coitus during menses. The period of greatest sexual vigor is that in which it is most liable to occur, and it is believed that sexual excesses have to do with its production. During menstruation the uterus and its appendages are greatly congested, and if sexual intercourse is indulged in at this time, this hyperæmic condition will be aggravated, and it may go on to extravasation. Some cases have co-existed with extra-uterine pregnancy, and probably been due to it. It has been pointed out by Bernutz, Matthews Duncan, Wade of Birmingham, and others, that some of these pelvic hematoceles arise simply from a discharge of menstrual blood through the Fallopian tubes, instead of by its usual outlet, the os. That this reflux does not happen more frequently in mechanical dysmenorrhœa seems rather strange. An unusual dilatation of one or both of the oviducts would be favorable to the escape of the uterine fluid into the peritoneum. This would seem to conduce to this result more than a strictured condition of the cervix uteri.

532. **Symptoms.**—There is commonly sharp abdominal pain at the commencement of the affection, one or other of the iliac regions being the seat of it. Soon a swelling is likely to be felt over the site of pain,

tender on pressure, immobile, and not very well defined. Sickness and vomiting sometimes occur, but they may be absent; there is usually, however, some febrile disturbance. Difficult defæcation and micturition are usually experienced. There are exacerbations of pain from time to time. After a while, less pain may be experienced. The difficulty in evacuating the rectum and bladder, however, continues; but generally the dysuria is more rare than the imperfect defæcation. Attempts to move the leg of the affected side occasion an increase of the pain. A sense of weight in the pelvis, with bearing down, is also common.

On examining per vaginam, we usually detect some bulging of the wall of the vagina. It may be a rounded, fluctuating tumor, pushing the uterus forward and upward; but this will differ according to the site and extent of the effusion, and it may be absent altogether. While at first the tumor may be of a fluctuating character, it soon becomes firmer and harder, and it has been mistaken for a fibrous tumor. M. Malgaigne committed this blunder, and operated with a fatal result. In some cases, the tumor reaches from the pelvis far up into the abdomen; in the extra-peritoneal form it is often very large. In this latter form, too, it may gravitate lower into the pelvis, being unrestrained by peritoneum.

533. **Course of the Malady.**—The course of a hematocele is not uniform. Sometimes it diminishes gradually and disappears, leaving behind a little thickening and induration at the root of the vagina. At other times, after shrinking a little, it will enlarge again at a menstrual period. This would seem to favor the view that a reflux from the uterus is a common cause; and, indeed, we are of opinion that this often explains its production. The gradual absorption and disappearance of the tumor is by no means a frequent result; on the contrary, a more common termination is the contents passing by the rectum or vagina. Sometimes the sac bursts into the peritoneum, with fatal results. In addition to the escape of the contents by perforation through the rectum or vagina, these may also be discharged by the bladder. There is another way by which the tumor may be removed, and that is through the Fallopian tubes, and uterus and vagina. The contents of the tumor have been known to make their exit per vaginam, and yet, on examination, no ruptured part or perforation of the vaginal wall could be discovered. The way of escape, therefore, could only have been as indicated. The time that may elapse ere absorption takes place, or the tumor bursts into the vagina, etc., varies much. It may be only a few weeks; at other times, months may transpire. When death occurs, it is from inflammation, or hemorrhage, or collapse,

534. **Treatment.**—In treating a pelvic hematocele, the chief things to be attended to are the arrestment of the hemorrhage and the averting of inflammation in the first place; and after a time, if necessary, the evacuation of the contents of the tumor. In order to check the bleeding, we need hardly observe that the woman must rest in the horizontal position, and avoid everything that could possibly cause excitement. Iced water should be injected into the rectum, and bladders of ice may be applied over the lower part of the abdomen, and around the external parts of the pelvis. The astringent remedies that may be given internally are the liq. ferri. pernit. and gallic acid, in maximum doses. Ice may with some advantage be given also by the mouth, and ergot and Indian hemp. Exhaustion and collapse must be met by the generous use of stimulants: but during the acute stage of the disorder, the diet should not be very liberal. Great caution, in the way of rest, is required during the mens-

trual period. Opium may be given to ease the pain, and the abdomen may be leeched; but hot poultices and fomentations are obviously inadmissible.

Question of Opening the Tumor.—There has been, and still is, no little difference of opinion with respect to the propriety or not of puncturing the tumor. Some distinguished authors, such as Trousseau, Nélaton, and Voisin, are rather against it and favor a passive and expectant policy; and Dr. M'Clintock, who has treated a good many cases, is chary about employing the trocar. His words are, "I would not be inclined to resort to the trocar unless urgent symptoms were manifested, in consequence of the bulk or mechanical pressure of the tumor, and not even then, unless it were in the chronic stage." Nonat deemed puncturing an inevitably fatal procedure; but this was quite an erroneous and unwarranted opinion. Sir James Simpson recommended the expectant plan for a time; but if the tumor enlarged from inflammation, etc., he advised and practiced the opening of it. Dr. Matthews Duncan recommends passivity while the tumor is firm, but when it liquefies, and is evidently offering to discharge, he practices a free opening with the bistoury. Puncturing with a trocar is not nearly so satisfactory, as it does not afford an ample enough outlet. In opening the tumor, care must be taken not to wound the contiguous viscera. Open the most prominent point in the vagina, and as near the middle line as is possible. In some cases, when the tumor reached far up into the abdomen, paracentesis has been performed. After operation, and when the female is slowly improving, chalybeates and a generous diet should be given. She should also be enjoined to be careful at a menstrual period, and to avoid anything that would conduce to congestion of the genital organs. Coitus should be abstained from for a considerable period.

CHAPTER LX.

ON THE ARRESTMENT OF INVOLUTION OF THE UTERUS: SUB-INVOLUTION, ETC.

535. The uterus, by a process of fatty degeneration and absorption, speedily begins to diminish after parturition, and usually this process is effected in one fifth of the time which is required for its development during pregnancy, or in about six weeks. This process of involution may be interfered with by congestive or inflammatory conditions, and then we have sub-involution. The uterus remains nearly of the same size as it was about twenty-four hours after the completion of labor. When a uterus in this condition is examined microscopically, it is found to be healthy enough; there is no morbid deposit; and its large size is simply due to the process of absorption being checked. In this state, although it cannot be termed morbid altogether, the uterus is incapable of the physiological processes of conception and gestation. Further consequences, too, are apt to follow, such as prolapsus, chronic congestion, and chronic metritis.

Diagnosis.—There is usually bearing down, and a sense of fullness and weight on the pelvis. On examination, the fundus is felt large and flabby, and the os and cervix are the same, and lower down than usual. Shooting pains are experienced at the lower part of the abdomen and back, and also down the thighs. Menorrhagia may occur. Pain in defæcation is common, and sometimes there is an almost unceasing sanguineous discharge.

536. **Treatment.**—Leeching and fomentations at an early stage; but we don't think there is much good got from these. We must endeavor not to deplete much, for many of these cases are associated with scrofula, anæmia, and debility. Some good is done by giving a small dose of hydr. cum creta and comp. ipecac. powder—two grains of the first and four of the second—twice a day, watching the physiological effects of the mercury, and stopping at slight tenderness of the gums. Scanzoni is fond of the cold douche to the uterus, and we believe it to be very beneficial. If the case gets chronic, the following mixture should be given: Potassii iodid., grains 36; potass. bromid., 6 drachms; ferri ammon. cit., 3 drachms; aquæ, 8 oz.: mix. A tablespoonful twice a-day to begin with. This mixture is alterative, calmative, and a chalybeate tonic, and does an immense deal of good. There is an injection we have employed, and, we think, with decided benefit, to the interior of the uterus, viz., acid. tannic., 2 drachms; iodum, 5 grains; potass. bromid., half an ounce; water, a pint. This is applied with an elastic tube inserted into the os, the woman being in the semi-erect, or better, the erect position, so as to avert the risk of flooding the oviducts. Although we believe, with Barnes, that the interior of the uterus tolerates pretty strong fluids better than was at one time thought (indeed, we have injected them into its cavity before Dr. Barnes's paper on the use of the perchloride appeared), still we are of the belief that the less flooding of the Fallopian tubes with pungent or acrid fluid the better. Dr. Matthews Duncan has reported cases where there was preternatural patency and dilatation of these tubes; therefore we ought to be careful not to employ force with our injections, but to throw the fluid in gently, the woman not being on her back, but raised, as before noticed. Of course, we keep clear of a menstrual period. Pessaries of iod., plumb., tannin, etc., may also be used.

What of Ergot here?—This drug is of very great service, especially where there are almost continuous oozings from the uterus. Even in a flabby, non-gravid uterus like this, it induces contraction, and thus conserves blood and husbands strength. The loss of blood in such cases retards and thwarts restoration. While giving ergot to save blood, then, we also keep plying the woman with the lighter forms of iron (first the ammonio-citrate, then the liq. pernitrate), in order to hasten the production of new blood; nourishing diet, some good wine and change of air. Salt-water and sitz-baths are also useful. If possible, let her go to Kissingen or Kreuznach. Some highly useful information may be got on the enlargements of the uterus from Scanzoni's able work (Die Chronische Metritis), and from the admirable writings of Becquerel, and Bennet, and Tilt.

537. **Super-Involution—Excessive Involution.**—While we have cases where involution proceeds slowly, or is arrested, there are others where the process is carried on with preternatural celerity. Sir James Simpson and Dr. Montgomery have called attention to these. Chlorotic and anæmic females are most prone to it. Our own belief in reference to these cases is this: In many of them there was an abnormally small uterus before conception. We have met with such, and where there was

some disorder of menstruation and a reduced uterine cavity. In such instances, then, the super-involution is nothing more than the return of the uterus to its wonted diminutive size.

Symptoms.—Amenorrhœa, and sometimes pain in the lower part of the uterus. One's suspicions are aroused when, after the cessation of lactation, the menses do not appear. On examination, the cavity of the uterus is found shortened to two inches or so. The organ is a little harder, and the os and vaginal part of cervix smaller.

Treatment.—Sir James Simpson suggested the introduction of a pessary into the uterus, with the view of stimulating to enlargement. He used with much success, at least in the virgin uterus (abnormally small), the galvanic pessary. We have had little experience of this plan in the virgin, but in the married woman we have adopted it—not, however, with very great success. It is one thing for the uterus to enlarge in the presence of a living child, which can only be developed, and grow, if the former does the same, which cannot be nourished without the vessels, etc., of the womb growing greatly; but quite another for it to develop in presence of a bit of inanimate matter. We have obtained much benefit in the anæmia of involution (or, may we not say as well, the involution of the anæmic state?) from the use of the chalybeate tonics carried on for a long time, and occasional doses of the tincture of cantharides. Friction, and inunction of strong camphor ointment over the ovaries, with change of air and general hygienic measures, also do good.

538. **Irritable Uterus.**—The uterus is sometimes the seat of intense pain, although no disease can be detected; and this peculiarity was termed by Gooch, "irritable uterus." There are very different opinions held by authors in regard to the real nature of the disorder, some holding it to be a neuralgia, others maintaining that the pain always indicates either inflammatory action or some flexion of the uterus, such as retroflexion. Dr. Tilt views it as a neuralgia due to a "morbidly inclined nervous system," and he says that any irritation of the uterus or ovaries will, in such circumstances, set up the pain. Dr. Graily Hewitt says that "irritable uterus" is just aggravated retroflexion. Dr. Tyler Smith believes that the condition to which this term is applied is a hysterical neuralgia or hyperæsthesia of the uterus, and that it may be associated with uterine lesions of diverse kinds, or with none at all. Our own belief is this: that there is a neuralgia of the uterus without any appreciable lesion of the organ, whether strictured cervix, ulceration of the os, congestion, metritis, flexion, or version. Only in some of these cases there will be found ovarian irritation, and an ovary, perhaps (usually the left), lying low in the pelvis.

539. **Symptoms.**—Intense pain in the organ, with tenderness, aggravated on pressure. Movement of a slight kind intensifies it, and there are frequent exacerbations from time to time. At the menstrual period especially, the pain and tenderness are much enhanced.

Treatment.—Of course, if it is associated with any form of uterine affection, that must be combated. If a pure neuralgia, use the warm hip-bath, impregnated largely (if the woman can afford it) with camphor and bromide of potassium. Give internally an anodyne, such as the following: Potass. bromid., 3 drachms; tinct. cannab. ind., tinct: hyoscyam., of each, 2 drachms; infus. lupuli, to 8 ounces: mix. A tablespoonful a dose. This mixture will alleviate the intolerable pain somewhat, and help to allay ovarian irritation. If it does not succeed in mitigating it recourse must be had to opiates, but as far as possible avoid them

Thirty-grain doses of the bromide of potassium may be given, apart from this mixture, twice a day, as an ovarian calmative, if we may so speak. Quinine should not be lost sight of here; it has an unchallengeable reputation in the neuralgias. Vichy and Wiesbaden may aid a little.

CHAPTER LXI.

HYDRAMNIOS: DROPSY OF THE OVUM: HYDROMETRA.

540. This is an excessive secretion of liquor amnii, distending the uterus to a great extent. It is, as pointed out by Kilian (Die Geburtslehre, vol. ii., p. 456), frequently co-existent with twin gestation. Dr. M'Lintock (Clinical Memoirs on Diseases of Women, 1863, p. 376) has also testified to its proneness during plural pregancy. Numerous instances are recorded, also showing its co-existence with the anencephalous monster and with spina bifida. We have found the same to exist in some cases of hydrocephalus. In these, enormous quantities of fluid came away, and we were almost certain that there would be something morbid on encountering the cataclysm of amniotic liquor.

Causes.—Disease of the amnion. There is an intimate relation between this and disease of the cerebro-spinal system of the fœtus. It has been noticed that jolting in springless vehicles, and other rough kinds of locomotion, have preceded the affection. We believe that concussion in strumous females has much to do with its production.

Symptoms.—This condition has been mistaken for ascites and ovarian disease. The abdomen swells to an enormous extent in some instances, causing pain from the pressure, and the weight of the distended uterus on contiguous parts. There may be no œdema of the legs or face, but there is a pinched, haggard, and anxious expression of the latter in many cases; that is to say, the peculiar facial features of the gravid state are much exaggerated. There is usually great discomfort from the extreme tension and the squeezing of the neighboring viscera, and spurious pains are set up. Careful auscultation sometimes fails to elicit any fœtal cardiac sounds, and even palpation of a thorough character may fail to detect any portion of the fœtus. In our own cases, however, we have been able to make out the sounds of the fœtal heart, either over the abdomen, or by vaginal auscultation; and by making the female change her position for a short time to that on the abdomen, or partly on the abdomen, at the same time supporting her, we have been able to discover some part of the child. Usually, on introducing the finger into the os, we are able to detect the membranes. It is necessary to be particular here, for (as has happened even in a distended bladder) some women have been tapped, and others on the eve of it, by the surgeon, who imagined he was dealing with an ascites. Before resorting to this proceeding, we would not fail to exhaust everything likely to throw light on the subject. In addition to the foregoing signs, we would master the previous history; we would interrogate the woman when she ceased to menstruate; about morning sickness, etc.; and if, and when, she perceived fœtal movement; also, whether she had been exposed to any rough, jolting locomotion. It has been found that in dropsy of the ovum, with excessive accumulation of fluid, the uterine walls become attenuated, and are prone to rupture. The woman, soon after delivery, sometimes experiences intense rigors, just like a seizure of ague.

541. **Treatment.**—When the distention is great, and quite intolerable, we must rupture the sac, and permit the evacuation of the fluid; seeing, at the same time, that the nurse has at hand a capacious vessel for the reception of the discharge. When delivery is terminated, secure efficient uterine contraction. Sometimes this will not naturally come here, owing to the extreme stretching of the muscular fibres; if not, then use friction; grasp the uterus over the part of insertion of the oviducts; and if that won't do, spare not the great oxytoxic, ergot. There is hardly a uterus under the sun, we should imagine, that won't be thus made to contract. See that the ergot is pure and fresh, for as counterfeit coins and characters are by no means a rarity, so neither is indifferent ergot. The good article, however, compels almost certain submission; the uterus crouches under it (if we may so speak) just as the serf does under the lash of his taskmaster. For the rigors, give hot drinks immediately; mere extra clothing will hardly subdue them, so severe are they. The following draught will also help much: Spt. ether nit., a drachm; liq. morph. hyd., 10 minims; tinct. cardam. co., a drachm; water, an ounce: mix. Take the whole. This is a potent diaphoretic while under the blanket. The binder should be applied with extra care, adjusted daily for a while, and worn some time longer. Nutritious food, and some wine, should be given at an earlier period. A long course of iron, chemical food, or cod-liver oil, should be adopted, in order, if possible, to prevent a recurrence of the affection at a future pregnancy; and should the female become again pregnant, all violent exercise on her part should be scrupulously avoided during gestation.

There is an excellent paper on this subject, by Professor Alex. Simpson, in the Edin. *Med. Jour.* for April, 1865.

542. **Physometra.**—This is an accumulation of flatus in the uterine cavity; it is not a very common disorder.

Causes.—Some authors believed that the lining membrane of the uterus secreted gas under morbid conditions, but this opinion is not now much entertained. The true cause seems to be the decomposition of a portion of placenta, or fœtus, or mole, retained *in utero.* Air enters by the os, and the retained portions decompose and evolve gas. The os then closes, or is plugged by mucus or other secretion, and thus the flatus gets pent up.

Diagnosis.—Resonance on percussion, and on pushing up the distended uterus by the finger in the vagina, it will be found extremely light. On inserting a long elastic tube, gas will escape. Sometimes gas escapes by the vagina, but Dr. Harley has pointed out that this is often only from the vagina. By spasmodic alternate contraction and relaxation of the abdominal recti muscles, the air is drawn into the vagina. When air issues from the vaginal canal, then, we are not to conclude that it has escaped from the uterus, unless we have the distention of that organ, and resonance, etc.

Treatment.—Introduce a long elastic tube cautiously through the os, which, if necessary, might be previously dilated with a tangle tent; and when the gas is evacuated, use daily, for some time, a tepid injection into the uterus of the following: Potass. permang., 4 grains; acid carbolic, 4 minims; water, a pint: mix. Do not neglect the precautions previously given as to uterine injections.

CHAPTER LXII.

PREGNANCY COMPLICATED WITH ZYMOTIC DISEASE: SCARLATINA, SMALL-POX.

543. There is a pretty wide belief amongst obstetric authors that pregnancy and zymotic diseases do not consort well together; that, in point of fact, they are pretty much incompatible. They are believed not only prone to abbreviate the term of gestation, but to threaten the existence of the mother. For example, Dewees was wont to say, "The woman who has scarlatina in her lying-in dies." This is, perhaps, rather too sweeping a statement; but, undoubtedly, the condition of the system during pregnancy renders the poison of scarlatina peculiarly fatal in some way or other. Women have succumbed within twenty-four hours in some cases; at other times, however, recovery has taken place. We are always very glad to find, when a woman is confined during the presence of this disease in her dwelling, that she has passed through the malady previously. We have notes of some cases in our own practice where the women were seized during pregnancy. In one, the seizure occurred about the 5th month, and led to abortion three days after the appearance of the eruption. The woman recovered slowly. It was a mild attack. In others, the disease appeared at the end of the 7th month, and led to premature labor, the infants surviving, and being apparently free from fever, and the mothers doing well.

544. **Pregnancy with Small-Pox.**—When small-pox, whether natural or modified, invades the pregnant woman, she frequently aborts, and occasionally dies. The unmodified (which, of course, is now rare) is much more certain to procure miscarriage, and more likely to occasion death. If it be a case of modified variola, and abortion does not happen, then all the more felicitious is it; she has a fair chance to recover. If abortion sets in, or (being seized at the natural termination of pregnancy) labor at the full time, then is she encircled with greater dangers; for uterine hemorrhage is a common concomitant; and metritis, or phlebitis, is apt to follow. Some females suffering from chronic amenorrhœa, on being attacked with small-pox, are cured of this disorder: but it is from the little rivulet (where drowning is hardly possible) to the deep sea; in other words, a serious menorrhagia is induced. But although abortion does happen, it is by no means generally fatal to the mother. On the contrary, numerous cases are on record where she got on quite well. We think much depends on the period. If she be near the end of pregnancy, then there will be more danger.

545. **How does the Small-Pox Poison Operate?**—Probably, in part, by affecting the lower portion of the medulla spinalis, as ergot does, and thus exciting uterine contraction, and in part by interfering with nutrition. The toxæmias are all prone to excite uterine contraction through the medulla. Brown-Séquard proved this in regard to carbonic acid; and we observe the same in cases of asphyxia, especially those which are acute.

Influence of Small-Pox on the Fœtus.—The fœtus is affected subsequent to the mother, not synchronous with her. The period is about eight days after the maternal invasion. It sucks up the zymotic poison—

that is to say, it receives it through the membrane by which it is nourished and ærated—after its parent has manifested the disease. If abortion occur during the eruptive fever of the mother, then the child will be found to have no eruption, this coming on later. In children born thus, vaccination will not succeed. Some children have been born with the eruption on them, and others with the evidence of it in pitting. We have met with two cases of small-pox during pregnancy. Both were modified. In one, the woman was seized at the 5th month and recovered, the child going to the full time. This child showed no signs of having had the disease, and vaccination was quite successful at the 3d month. In the second case, the woman had an attack at the 7th month and aborted, the child being born alive, but dying from the disease a week after. The mother recovered.

546. **Should Pregnant Women be Re-Vaccinated?**—Yes. We observe that Dr. Meigs, in his excellent work (Science and Art of Midwifery, 5th ed., p. 501), makes the following observation: "Never vaccinate a pregnant woman, or one recently confined." Had he simply deprecated vaccination in the recently confined, we should have heartily concurred with him; but when he forbids it during gestation, we no longer agree. There are numerous cases testifying to her greater safety with modified variola than with the pure disease. The *Lancet* some time ago had some editorial temarks on this very subject. They hold the view we are advocating, and say, "We have ourselves tested the effect of perfect and severe vaccinia in pregnancy with satisfactory results." Then they say that during epidemics in London and elsewhere, re-vaccination has been extensively practiced in the pregnant woman, and that Mr. Ceely, and Dr. Seaton, President of the Epidemiological Society, both entirely approve of it.

The Child.—Children have been born with the small-pox eruption on them, the mother, the while, having escaped. This fact is strongly in favor of vaccination. In speaking of the way in which the poison operated, we omitted to state that, while this went to the medulla, like ergot and carbonic acid, in some cases it induced abortion by invading the child, and killing it.

Should New-Born Infants be Vaccinated?—When a great epidemic rages and ravages, the infant ought to have the protection of vaccination. It has often been done, without any bad results, in children from one to seven days old. It appears to take very readily, indeed, at this early period.

CHAPTER LXIII.

TETANUS IN THE PUERPERAL STATE.

547. We must still subscribe to the statement made many years ago by Dr. Robert Reid (Nature and Treatment of Tetanus, p. 52), "that injuries of internal organs do not appear to have much tendency to produce tetanus." Among these organs the uterus is not an exception; for in thousands of instances it has been lacerated and irritated without giving rise to the affection. The home journals and the Continental *Jahrebucher*

may be scanned for long periods without meeting with a puerperal case; and when one is discovered, it is usually found to have followed an abortion, an operation for dilating the os, or the removal of a tumor, rather than a labor at the full term of gestation. When a case at the full period is reported at a society, it is usually welcomed with interest and wonder; and there are not wanting those who entertain a mixture of misgiving and doubt as to its reality, so seldom does the complication appear. As pointed out by Sir James Simpson, in the second volume of his Obstet. Works, p. 49, the terrible affection usually sets in as "a secondary obstetrical disease," in the same way as its advent occurs in connection with surgical maladies. There are not a few cases on record where the disease supervened on abortions. Several of these are reported in Sir James Simpson's works. Dr. M'Gregor reported a fatal case in the Edin. Med. Jour., July, 1864. The disease set in seven days after an abortion at the third month, and proved fatal in a day or two. They are terribly fatal as a rule. The most recent case that we are aware of, reported as happening after a labor at the full time, occurred in the practice of our friend, Dr. Craig, of this city. Dr. C. has given an excellent account of it in the Edin. Med. Jour. for July, 1870. The woman was delivered by a midwife of a strong, healthy boy on the 27th of October, and nine days afterward she was seized with tetanic spasm. We shall insert a great part of the doctor's account of the case, as the complication is so very rare. He says:

"On the evening of Wednesday, October 27, shortly before midnight, I was requested to come immediately to see her, and in five minutes afterward I was at her bedside.

"On entering her bedroom, I learned that, several hours previously, she had been delivered of a strong, healthy boy, a woman having acted as accoucheur. The placenta was still retained, although the nurse had made several unsuccessful attempts to remove it. This midwife was very adverse to a medical man being called in, and only consented after repeated attempts to remove the placenta had failed.

"I found the patient very weak, chiefly from hemorrhage. The uterus was flabby and uncontracted. Having caused the uterus to contract by external manipulation over the abdomen, I very soon was enabled to remove the placenta, being careful at the same time to remove all clots from the vagina. I found, however, a large amount of coagulated blood in the bed beside the patient.

"By the time the placenta was removed the patient was very faint, and I accordingly administered a little stimulant, and she soon revived. The patient passed a good night, and told me the next day that she had slept well, and never was better after any previous confinement. For more than a week she appeared to be making a fair recovery. The secretion of milk was very copious; and on Thursday, November 4, eight days after her confinement, the patient was so well that she insisted on getting up out of bed; but as her pulse was fully 80 per minute, I refused to allow her. Her pulse since her confinement had generally kept above 80, and sometimes was as high as 100 per minute.

548. "The high pulse was suggestive of mischief; but as her appetite was good, and the secretion of milk abundant, I hoped that no bad results would follow.

"On the morning of Friday, November 5, whilst she was at breakfast, she suddenly felt something wrong with her throat when swallowing some tea. She told me of this when I saw her in the course of the forenoon; but I thought she had caught cold, and told her to wrap her neck in flannel, and at the same time gave her ten grains of the compound powder of ipecacuanha.

"On the afternoon of the same day I was sent for, as she was worse; but being professionally engaged elsewhere at the time, it was several hours before I could see the patient. Meanwhile, another medical man was called in to see her, who ordered a mustard poultice to be applied to the throat. I saw her in the course of the evening, and found that the mustard ordered by my brother practitioner had produced no benefit. I found, moreover, that now she had great pain and difficulty both in opening her mouth and in swallowing. Her own idea was that the 'pap of her throat' (uvula) had fallen down, and that if I could only lift it up she would be all right. Of course, I knew she was mistaken, but I mention the fact to describe the patient's own feelings at the time. She could not open her mouth sufficiently to allow me to see as far back as the uvula, and she had very great difficulty in swallowing. On external manipulation, however, no pain was elicited, showing the absence of inflammatory action; in fact, she experienced pain only when trying to open her mouth, or when swallowing.

"Although at this time there was a certain amount of trismus, I could not bring my mind to the conclusion that it was a case of tetanus. Her bowels being somewhat constipated, I ordered her some opening medicine. Hoping it was only a spasm of the muscles, produced by cold, I ordered hot poultices of bran and chamomile flowers, along with hot fomentations of the same. All these were applied most faithfully and effectually during the whole night.

"Next morning (Saturday, 6th), between six and seven o'clock A.M., I was sent for, as she was no better, but worse, the poultices and hot fomentations, although constantly applied all night, having produced of no change for the better.

"I may here mention that the patient was fully convinced that something was sticking in her throat, and she wished me to cut in and see what was wrong, and rectify matters. Such was her feeling.

"It was agreed by the husband and myself to call in another doctor in consultation. I accordingly went direct to Dr. Patrick Heron Watson, who kindly came and saw the patient with me. She could still swallow, but with very great difficulty, and Dr. Watson was unable to see the back part of her mouth, owing to the rigidity of the masseter and temporal muscles. The pulse was about 130 or 140 per minute.

"After a careful examination of the patient, Dr. Watson gave it as his opinion that it was a true case of tetanus. At his suggestion I ordered tincture of Indian hemp—25 minims to begin with, and ten minims every hour afterwards; also, to continue the poultices and hot fomentations. The medicine I gave the previous evening not having acted sufficiently, I ordered a turpentine enema to be given. This had the desired effect of thoroughly clearing out the bowels. The fæces had a most offensive smell.

"Notwithstanding all our treatment, the patient got rapidly worse; and after she was unable to swallow, I ordered nutrient injections per rectum, and even gave the tincture of Indian hemp in the same way.

"About mid-day on Saturday, in addition to well-marked trismus, there was added opisthotonos, the longitudinal muscles at the back of the neck being the muscles chiefly affected. They were in a state of tonic spasm. I ordered the hot fomentations and poultices to be applied to the back of the neck also. All our treatment, however, proved unavailing, for the disease, which was now well marked, made rapid progress. She died on Sunday morning, the disease having lasted forty hours."

549. **Causes.**—We can only conjecture as to these. Probably the generation of a blood-poison from a combination of elements existing in the air, and others at the seat of the uterine wound. There can be little doubt that many poisons or medicines, existing and yet unknown to us, may possess the power of occasioning a super-excited condition of the reflex spinal system. We all know the effect of strychnia, and many of us have witnessed local tetanus of the uterus, produced by over-much ergot. In some of the puerperal cases there was profuse flooding beforehand, and we know that this has a tendency to pave the way, at least, for clonic spasms, which are, however, more amenable to treatment than the form we are considering. Cold seems to predispose to the disorder; and although the disease is rather more prevalent in warm countries than in this higher latitude, the majority of the cases have happened in winter.

Treatment.—We have little of an assuring kind to say here, for treatment has hitherto been very unsuccessful. The malady has proved very fatal. Ice may be applied to the spine, and doses of chloral hydrate given occasionally. Various other drugs have been tried from time to time, such as Indian hemp, belladonna, chloroform, the Calabar bean, and the nitrite of amyl. In regard to the Calabar bean, it may be given in the form of tincture (prepared by dissolving 15 grains of the officinal extract in 10 drachms of rectified spirit), 15-minim doses every hour, and watching its effects. Woorali has been tried also, but with indifferent success. It is injected subcutaneously in very small doses, such as from 1-20th to 1-10th of a grain. The nitrite of amyl, we think, might be tried with better prospect of success. It is given by inhalation, four to six drops on a handkerchief, and repeated.

CHAPTER LXIV.

AMENORRHŒA.

550. It is common to divide this disorder into three varieties, viz.: (1.) Where the menstrual fluid has never been secreted. (2.) Where it is secreted, but retained. (3.) Where it has been secreted and carried on normally for a time, but has afterward become suppressed.

Causes.—Emansio Mensium.—These are numerous. Various local and constitutional affections interfere with the advent and appearance of the first menstrual discharge. In some girls the sexual power is developed slowly, and they are late in evincing the signs of womanhood, just as some plants and trees are later than others in bearing fruit. There may be no disease in such cases, only tardy development of the natural function. The existence of tubercle in some part, more particularly the lungs, is a frequent cause of the affection. There are few of us who have not witnessed such cases, which are familiarly known by the name of tubercular, or phthisical, amenorrhœa. Chlorosis and leucocythemia are also unfavorable to its appearance. Various diseases occurring about the period of the normal advent of the secretion, such as scarlatina, small-pox, etc., check it. Cretinism is also a cause. In other cases, *emansio mensium* is the result of disease of the ovaries, imperfect ovulation, absence of Graafian vesicles, absence of the ovaries, or imperfectly developed uterus. The os or cervix may be occluded; even the uterus itself may be wanting. Further, the cause may be in the vagina; it may be imperfectly formed, or closed by adhesion. Lastly, an imperforate hymen is a frequent cause.

Suppressio Mensium.—A suppression of the discharge after it has been established may be due to a variety of causes, some of which are included in the foregoing. Sudden and severe chills, cold or wet feet, emotions, such as disappointment, anger, or fear, invasion of disease, such as fever, etc., may stop it suddenly. A sea voyage has been known to stop it, and migration from an inland residence to the sea-side, though only for a sojourn of a month or two. Then there is a more gradual and tardy suppression due to the setting in of debility, whether from hemorrhage or organic disease. Chronic discharges, extensive ulceration, anæmia, tubercle, may all conduce to this. Plethora, and excessive intercourse; sedentary life, on the one hand, or luxurious and indolent habits on the other, are also factors. Then we may have an attack of ovarian disease.

551. **Symptoms.**—In *emansio mensium*, where this is due to the absence of the ovaries, there may be little in the way of symptom. The female may be pretty strong and well, and there will be no attempt at menstruation at all. In other cases, where there is no congenital deficiency suspected, yet where the discharge does not appear, there are a variety of distressing symptoms. If the girl be plethoric, there will be febrile symptoms, a corded pulse, flushed face, sense of fullness about the head, and throbbing headache. In the anæmic girl these febrile manifestations are wanting, but she shares with her more plethoric sister the other troublesome signs. These are: Feeling of weight at the lower part of the abdomen and back every month; back pain; shooting pains down the thighs, and over the ovaries; wearisomeness, yawning, sighing. Sometimes there are hysterical seizures, accompanied with dyśpnœa, constipation, incontinence of urine. Pale-colored blood may be coughed up, or come away with the sputum; or it may assume the form of an epistaxis, a hæmatemesis, or a malæna. Pains in the side or between the shoulders, intolerance of light and of noise, anorexia, dyspepsia, and general malaise, are also common. These various symptoms—the menstrual molimen—may persist and appear, month after month, for a long period, until the function is established, or the hapless girl sinks into a state of irretrievable debility. It will be our duty, however, to strive hard to avert such a catastrophe—to aid Nature as far as we are able in the production of the needed reproductive force.

In those cases where there is organic obstruction to the outflow of the menses, the discharge has accumulated in numerous cases to such an extent as to simulate pregnancy.

552. **Treatment.**—In retention from obstruction, of course surgical treatment is demanded. The hymen has often to be cut through. The vaginal walls may have to be forcibly separated, or by means of the knife. The os and cervix may have to be tunnelled with a pointed probe or trocar. But previous to operative procedure, it is understood that the physician has previously tried all the other means, medical and hygienic, before resorting to it; that is to say, we do not rush with indecent haste

to the exploration of a young girl's vagina simply because she suffers from amenorrhœa. No; cases of obstruction, of occlusion, are exceptional, and we attend first to the state of the general health, trying all those means and measures we are about to name before resorting to that extreme. Where the *emansio mensium* depends on an "infantile uterus," that is, one where the uterus is smaller and shorter than usual, the galvanic pessary originated by Sir James Simpson is often of much service. It should be introduced very cautiously, and when in, vigilantly watched. The reason for this careful supervision is, that it may get displaced, and perforate the uterine parietes. Not very long since, we heard of one doing this, and of another being swallowed by the uterus (part of it at least), and occupying a long time in its extraction. The female, then, would not need to move about much while under its galvano-irritant influence.

553. Faradization, employed for weeks, has done good in some hands; but we think, in such cases, it is not equal to the pessary. Our own idea of the pessary is that it acts chiefly by irritating and setting up congestion, just as a foreign body does in any other part. It will even induce a discharge in an anæmic girl; but then, on its disuse, the amenorrhœa prevails again, her system being permeated only with hydræmic blood, and consequently lacking, as she does, the fit material wherewith to maintain the monthly "show." We have seen it induce, at one time, a colorless serosity; at another, a leucorrhœal discharge; but unless we are able also to restore the girl's blood to the normal standard, this discharge will recede, and, indeed, it is of little use while it lasts. We believe it to be often merely from the cervix, and not from the cavity of the uterus; therefore it is no fit indication of reproductive capability, of a healthier state of the ovaries, of sound and efficient Graafian vesicles, and normal ovulation. Marriage has undoubtedly achieved wondrous results, even in cases of protracted *emansio mensium.* The pale, pasty-looking, blanched, hysterically breathless, and languid girl has been by it transformed into a ruddy, active, vigorous, animated, and cheerful woman. The potent spell of some famed enchanter would seem to have passed over her, impelling her into a novel and more vigorous existence. It is not easy to divine how this great change is effected; but it would seem as if the sperm cells had the power not only of fecundating healthy germ cells, but also of amending defective ones—of rousing, in short, to healthy ovulation.

554. *Medicines, etc.*—What have we in this way of service in *emansio mensium?* Much, indeed. If the woman is plethoric, purge her well with the salines, such as sulphate of magnesia, or with cathartics, such as jalap, with a little aloes and podophyllin to unload the liver. The liver often requires a frequent filip, and these will give it well; but a change may be had occasionally to rhubarb or taraxacum. Sluggish bowel should be ruthlessly combated here, for it helps to maintain a plethoric amenorrhœa. The woman may also have hot hip-baths often and sedulously at the time of the *molimen;* and it may be necessary to leech her vaginal cervix. Under these means the function is often established.

In anæmia and the diathetic state, scrofula, with deficiency of the red corpuscles, the ferruginous preparations still stand unrivalled. There may be a question as to the *modus operandi*, but there is none as to the good achieved. Quésneville's view, that the iron combines with the blood discs, and that the blood, after receiving it, absorbs more oxygen (just as it does when we give the potass. chlor., and other alkaline salts), may or may not be open to doubt; but doubt has no place with respect to the benefit which the iron confers here. It is to be given regularly for a number of weeks; longer than the "*trois semaines ou un mois*" prescribed by the French lady, Bourgeois, two hundred and fifty years ago—for eight, ten, twelve weeks, if need be. It is good to stop at the end of a month for a few days, and begin again.

555. **What is the best Preparation of Iron here?**—This depends on the stomach of the girl. If there is much gastric irritation, if a tendency to vomit even light food, then the lightest preparation of iron is best: that is the ammonio-citrate. Stronger preparations are the sulphate, the tinct. perchlorid., and the liquor pernit. The saccharated carbonate and the hydrated peroxide are also useful preparations. Quêvenne's pulv. ferri, prepared by passing a current of hydrogen over peroxide of iron, heated to redness, is one of the best preparations. Given soon after a meal, it causes no uneasiness or pain in the stomach, and in course of time greatly improves the blood. There is a favourite Edinburgh pill, the aloes and iron one. We have two opinions about it: (1.) We have no doubt of its triumphs in anæmic amenorrhœa; and (2.) We believe that these would have been much greater had the iron been kept apart from the aloes. Two good fellows they are, but better (like near relations) when disjoined and apart. And for this reason: we give iron that it may act on the blood. Well, if we associate it with a drastic cathartic, it will be carried off too quickly by the bowels, and the increased peristaltic action of the gut will interfere with its absorption. We don't give a purgative along with quinine; it is too valuable to be thus thrown away. Then we give opium along with calomel, to prevent it being carried off too rapidly. In like manner, if we wish the full benefit of the iron, we will give the preparation pure and simple. Never ally a good drug with another, unless it enchances its action or countervails an evil connected with it. In amenorrhœa, then, the aperient, or the chologogue, which are often indispensable, should be given at a separate time.

556. **The Best Cathartics and Aperients.** We have found a pill such as the following very serviceable: Aloes socot., one grain; camphor, half a grain; myrrh, one grain and a half; ext. hyoscyam., two and a half grains: mix. One every night, if there is much sluggishness of bowel. If it purge too strongly, which seldom happens, a day or two may be missed. Rhubarb is another excellent aperient here.

Diet and Exercise, etc.—A good deal of out-door exercise is requisite—walking at one time, riding on horseback at another. The food should consist of the more easily digested meats—chicken, game, and occasionally roast meat. Cocoa is better than tea; but a good and unadulterated light wine is better than either. Claret is very suitable—a glass or two of it in water after a meal. Bismuth and ice are useful for allaying gastric irritation. Enemata of warm water thrown up the vagina every night are also helpful.

If change of climate have suppressed the discharge, a return to the wonted home may do good, and if sedentary pursuits be the evil factor, then these ought to be abandoned for a more active life.

CHAPTER LXV.

DYSMENORRHÆA.

557. There is often considerable difficulty and pain connected with the performance of the menstrual function, and sometimes there is less success in the dealing with such cases than with those where the discharge is absent. Painful menstruation is usually divided into four species: (1.) The membranous. (2.) The neuralgic. (3.) The inflammatory. (4.) The mechanical. There is difficulty and suffering with all of these, but the causes are different, and hence the different designations. As pain occurs in those cases where the canal of the cervix is not constricted, as well as in those where there is mechanical obstruction no little discussion and diversity as to the source of the pain has thereupon arisen.

(1.) **Membranous Dysmenorrhœa.**—In this species there is a membrane discharged from the uterus; the "membranous body" of Morgagni, who was amongst the first to describe it.

Nature of the Membrane.—About the nature of this membrane discharged by the uterus, there has been some conflict of opinion, just as difference marked the views entertained respecting the nature of the decidual membrane. Authors at one time held that it was just coagulable lymph, moulded to the shape of the internal uterine surface; but Sir James Simpson and Dr. Oldham adopted a different view, viz., that this membrane was just the superficial layer of the lining membrane of the uterus itself. This membrane becomes hypertrophied, and then exfoliates or sheds; and if it is examined under the microscope, it is found to be marked by the particular epithelium and mucous crypts or follicles of the uterine mucous membrane. When we meet with membrane coming away by the vagina, we are not necessarily to infer that it is uterine. Dr. Farre and others have shown that the vagina exfoliates its lining membrane as well as the uterus, complete casts sometimes coming away. Although we have classed this form separately, we must observe that this membrane may be thrown off either in the neuralgic or inflammatory variety. In short, the neuralgic, as well as the latter, may also be membranous. The pain is usually severe, and of a character similar to that described in the other forms.

558. (2.) **Neuralgic Dysmenorrhœa.**—This form of dysmenorrhœa occurs usually in females who have not begun to menstruate until somewhat late, say from twenty to thirty years. The pain, which is severe, begins a day or two before anything appears, continues to get worse when the flow is going on, and does not subside until it ceases. It is at times the very refinement of agony, and the woman writhes and wriggles under it, and is glad to seek alleviation from anodynes. The pain is not confined to the uterus, but radiates from it to every point of the compass, and concentrates largely in the ovarian region. Reflex pains are experienced in very remote parts. The pain will sometimes moderate a little, but this is just the harbinger of a more severe paroxysm. Gastric irritation and vomiting are often excited, and a variety of hysterical phenomena. In married ladies this form of dysmenorrhœa renders sexual intercourse very painful. It is almost intolerable; and in most cases

the usually extreme agony of parturition is greatly enhanced. Dr. West, in his excellent Work (p. 69), has pointed out that this form sometimes sets in in cases where menstruation has for long been comparatively healthy and painless, the cause being either cold or some inflammatory seizure of the uterus after delivery. We have met with this often, and are inclined to think that in some of the cases a certain amount of flexion had to do with it. Some of these neuralgic cases are associated with the rheumatic and gouty diathesis.

559. (3.) **Congestive and Inflammatory Dysmenorrhœa.**—This form occurs in plethoric females, both in virgins and married women. Febrile symptoms, with a throbbing headache, intolerance of light, and rigors, frequently herald the discharge. Before this appears, there is intense pain in the back, darting pains up toward the ovaries and down the thighs, and sometimes delirium and hysterical symptoms. The appearance of the menses, contrary to what obtains in the neuralgic form, leads to a diminution of the pain. The bleeding would seem to be the cause of the mitigation of the suffering, and the relief obtained is in the ratio of the amount lost. At least, when a good deal comes away, the alleviation is greatest; while, on the other hand, pain is prolonged by a scanty flow. When membrane drags its slow length out of the uterine cavity (as it does in some of these cases, as well as in the neuralgic form), the pain is aggravated, partly by mechanical irritation, and partly by plugging, and the impeding of the free exit of the secretion.

560. (4.) **Mechanical or Obstructive Dysmenorrhœa.**—We have no doubt whatever that this is a very prevalent variety, judging from our own experience and that of others. The causes are numerous. Sometimes it depends on a bending of the uterus—a retroflexion, for example; at other times from a constriction of the os, external or internal, or of the cervix, congenital, or the result of inflammation and ulceration. One occasionally meets with an os and cervix so narrowed that a small probe will not pass; at other times, with a flexion at the internal os equally obstructive. Hypertrophy of the cervix may lead to a narrowing of the canal; and polypi and fibrous tumors, though usually occasioning increased patency, sometimes cause obstruction. The "infantile" uterus has usually a narrowed canal, and the cervix may be convulsively contracted, according to Scanzoni. The pain attending this is just much the same as in the previous varieties, and depends partly on how much of interference there is with the outflow of the menses. In some instances, little comes away—just some small and imperfectly formed coagula.

561. **Question of the Cause of Pain in Dysmenorrhœa.**—Before stating the treatment of this troublesome disorder, we shall notice the question as to the cause of the pain. There is much contrariety of view here; in fact, there are two opposing camps; one holding that the pain is due to the obstruction, and the consequent impediment offered to the free egress of the menses; the other stoutly maintaining it to be of a purely neuralgic character. This conflict need not be matter of surprise to us, because we find that intense pain characterizes cases with normal patency of the canal, as well as those where there is obstruction. We have not the shadow of a doubt that, just as stricture of the urethra occasions painful micturition, so a strictured os and cervix will occasion painful menstruation. The uterus gets distended, and nerves are pressed upon, and cause pain. It is also excited to greater and more painful contraction. In all the cases of flexion which we have met with, the pain was more severe than where it was of ordinary patency. There is

another fact worthy of notice, viz., that where the os and cervix are flabby and preternaturally open, as in some cases of menorrhagia, the pain is either absent or at a minimum.

562. Scanzoni has pointed out how pain may be occasioned in some of these cases of dysmenorrhœa. Speaking of the nervous form, he says, "that the abnormal nervous irritation of the uterus may give rise to reflex movements of the organ, and to a convulsive contraction of the cavity of the cervix. Hence the escape of the blood, which is already effused, is impeded by an obstacle which irritates in its turn the motor nerves of the body and fundus of the uterus, and thus provokes painful contractions. This is what to us appears particularly to take place in cases where, after intense expulsive pains, lasting, perhaps, several hours, the patients suddenly eject a considerable quantity of blood, partly fluid and partly coagulated, and find instantaneous relief." Quite true; we have all observed this aggravated pain when the discharge was impeded, and its palliation, or disappearance even, when the pent-up discharge bursts forth. Dr. Marion Sims, in his Clinical Notes on Uterine Surgery, lays stress on the mechanical cause of the pain; and Dr. Graily Hewitt, in his work on Diseases of Women, article Dysmenorrhœa, supports the same doctrine; as likewise Dr. Greenhalgh.

In neuralgic dysmenorrhœa, we believe, with Tyler Smith, that the pain is greatly ovarian; at the same time, there is pain in the uterus also.

563. The conclusions which we have come to in reference to the pain of this disorder and its causes, arrived at from what we have witnessed, and from other data, are as follows: (1.) Pain is often the result merely of the increased vascularity of the lining membrane of the uterus at the menstrual period. (2.) It is aggravated in females marked by a morbid state of the nervous system, amounting then to a severe neuralgia. (3.) Blood must come away, and as the more freely it escapes in non-neuralgic cases the less likelihood there is of pain, so obstruction aggravates the suffering by impeding this flow. (4.) The greater the obstruction, the more intense is the pain, as a rule. (5.) Obstruction (short, that is to say, of course, of occlusion) does not always cause pain; and although in some instances it is not clear how this should be, in others it appears to be due to the small amount of blood secreted, and to the gradual nature of it, permitting of its escape without distention or pressure. (6.) Pain of a severe character occasionally co-exists with a pretty wide and and unobstructed os and cervix; and when this is the case, it is owing either to neuralgia or to an extensive and rapid secretion occasioning distention. (7.) Pain of an intense character often exists with a patent enough os and cervix; and a natural and unimpeded flow, due to the congestion of the ovaries in the process of ovulation.

564. **Treatment.**—In noticing the treatment, we shall begin with those forms where no operative interference is required. In the plethoric female—the inflammatory form—saline purgatives are to be given; and a little blood may be drawn from the cervix by leeching or scarification. This latter is best. After scarifying, some warm water should be thrown up the vagina to encourage the bleeding for a little. In extreme cases, the loins may be cupped. Constipation should be avoided, and to this end a pill, such as the following, should be frequently had recourse to: Hydr. subchlorid., a grain; resin of podophyllin, ¼ grain; aloes soc., a grain; ext. hyoscyam., 2½ grains: mix. That may be repeated as often as necessary, and it will give an excellent impulse to, and improve the secretions of, the liver and intestines. The female should avoid all stim-

ulating diet, take plenty of active exercise, and thus endeavor to subdue the plethoric state. The whole indication here, then, is to keep down local and general fullness, uterine and systemic plethora.

In anæmic or chlorotic females we must endeavor to improve the general health, by the employment of those means and measures treated of when speaking of amenorrhœa, such as iron, change of air, etc.

In the neuralgic form, hygienic measures should also be adopted in order to strengthen the woman, and a course of quinine and iron given. The bromide of potassium is excellent when the pain is greatly ovarian. It can be given contemporaneously with the tonic, though at a separate hour of the day. Give the tonic forenoon and afternoon, and the bromide morning and evening. It may be necessary in some instances to leech or cup over the ovaries, but not in anæmic cases.

565. In the rheumatic and gouty variety, we must combat these diathetic states by the most approved remedies. We know nothing better yet than colchicum for the one, and alkalies, along with an infusion of guaiacum (and sulphur baths), for the other. Blistering, like Davis, when needs be. These are some of the means to be adopted during the interval; but what have we to offer on the eve of, and during, the painful menstrual flow?

Measures and Remedies on the Eve of the Flow.—These are rest and warmth, hot hip-bath, and vaginal injections of warm water, with infusion of hyoscyamus or belladonna, or a little of the ext. or decoct. papav. Opium liniment may be applied over the ovaries and the sacrum, with warm fomentations afterward. Suppositories of morphia, or pessaries of belladonna, atropine, opium, or conium, are also useful. We have found benefit from the following mixture in some cases: Tinct. cantharid., a drachm; tinct. camphor comp., half an ounce; tinct. cannab. Ind., a drachm and a half; infus. guiaca., to 6 ounces: mix. A tablespoonful twice a day; to be carried on for six days or so. Some think there is virtue in guaiacum in the membranous form: Dewes has much faith in it. It may be given in the form of powder, or ammoniated tincture, twice a day.

Remedies during the Flow.—Patients often flee in their agony to "benumbing opium as their only cure," or relief from the suffering. Although it is better to avoid it, it has often to be given. Great relief is experienced by a suppository of morphia or opium, the nerves of the affected part being best reached in this way. A draught such as the following soothes, and does not arrest, the flow: Tinct. lupuli, a drachm; tinct. belladonnæ, 5 minims; tinct. camph. co., a drachm; aq. camphor, an ounce: mix. We have known some practitioners giving the Indian hemp; but this, while soothing, is objectionable here, inasmuch as it tends to arrest the secretion. It is better adapted for menorrhagia. Subcutaneous injection of morphia is of excellent service in severe cases.

566. *Operative or Mechanical Treatment.*—The mechanical treatment of dysmenorrhœa differs, because the conditions are many-complexioned. There can be no useful routine here, as in ague or gout. In one case, as we have seen, there may be an extreme flexion; in another, mere constriction; in a third, distortion from hypertrophy. The uterus, too, may be bound down by adhesions of longer or shorter duration. The first thing to do is to ascertain as correctly as possible the condition of the uterus, and also of its appendages; but this is often a delicate matter. Organic lesions may be present, and results of metritis and peritonitis, which may not be betrayed by adhesions. When these latter exist, as

often happens in prolonged cases of flexion, the risks of operative interference are enhanced, and the prospect of a favorable result is anything but cheering. A congested uterus, or one indurated from chronic metritis, demands preliminary treatment, such as will relieve fullness and tenderness, and diminish hardness and hypertrophy. Nothing softens better than a course of iodid. potass. internally, with pessaries of iodine and belladonna, and vaginal injections of warm water. The cervix may be painted from time to time with tinct. cantharid., or tinct. iodi. A careful course of the hydrarg. corrosiv. sub., one sixteenth grain in a drachm of tinct. cinchon. daily, on to tenderness of gum, then stopping, and resuming again in a week or two, does marked good in numerous instances. Contemporary with this potent preparation of mercury (which, by the way, the student should see is not allowed to drain away by the bowels), deobstruent pessaries may be introduced, such as iodid. plumb., iodine, iodid. potass., hydr., etc. Leeching may also help much. When your material is thus carefully prepared—that is to say, when the uterus by these deobstruent and antiphlogistic measures is relieved of its congested and indurated state—then may operative means be resorted to with greater safety and promise of success. What are these means? We may sum them up by saying, the dilating method, and the cutting plan—the bougie or tent, and the metrotome.

567. It was the late Dr. Mackintosh, of Edinburgh, who first proposed dilatation by bougies for this purpose. This was about fifty years ago. Bougies, we believe, have often done good, but there is often a difficulty in getting them introduced, and especially guided past the internal os, whose normally very narrow condition, as pointed out by Dr. Henry Bennet (see Inflammation of Uterus, 4th ed., p. 3), is still more strictured by spasm in some cases. The best plan, in our estimation, is to have a series of tangle tents, introducing a larger one every successive time, and getting it beyond the internal os. They are allowed to remain in six to eight hours. If irritation is set up, we will have to desist for a time; but then the cervix speedily contracts again. We have, however, seen much good done by these, even when there did not seem to have been much, if any, permanent dilatation, chiefly, we think, by softening the cervix, and making it more yielding. Metallic bougies may be used, but with these there is not the gradual expansion obtained by the laminaria tents. There are numerous cervical dilators, such as Marion Sims's, Priestley's, and others; but while they do good in some cases, they are likely to fail where there is much induration of the cervix. In our opinion, the great thing is to obtain dilatation of the internal os. The introduction occasionally of the uterine sound, some days previous to the menstrual discharge, is frequently beneficial. Sponge tents when well made are serviceable, but not equal to tangle. Neither of the kinds of tents will go in unless small and firm at the point, and often they will stop at the internal os. One advantage of the tangle over the sponge is, that it is firm and expands equally, while the sponge tent does not. We have seen the sponge expand well in every part save the one desired; it failed to overcome the constricted part. Marion Sims, an almost unrivalled oracle on this, as on other uterine subjects, has abandoned the sponge tents for purposes of dilatation.

Evils of the Plan of Dilatation.—There are undoubtedly risks in connection with the method of opening up the os and cervix. Some women tolerate tents as badly as those men who are almost "polished off" by a single introduction of the catheter. Rigors supervene, and sometimes intense fever, metro-peritonitis, or cellulitis. Marion Sims had a case of this kind in 1859, and he resolved to abandon the method forever, and go in for the cutting operation. But while these evils will accrue even in selected cases, and with the utmost care, at times, in other instances not a single bad result follows. Another drawback of the bougie or tent plan of dilatation is this, that contraction back to the old dimension often takes place, inducing the old dysmenorrhæal symptoms.

568. **Metrotome, or Operation by Incision.**—There are numerous surgeons who now prefer incising to dilating, by means of the metrotome caché, of which various modifications of Sir James Simpson's original one are now made. The late distinguished baronet rather preferred cutting to the process of dilatation, and, as previously stated, Marion Sims, a justly high authority here, strenuously advocates it. As there are not a few authors who believe cutting to be dangerous (even more so than dilatation), we shall give Marion Sims's opinion of its safety in his own words. He says (*Lancet*, March 4, 1865): "Dr. Emmet and myself, at the Woman's Hospital, and in private practice, have cut open the os more than 500 times; and I now remember but a single instance in which it was followed by inflammatory symptoms, and this resulted in pelvic cellulitis and abscess. This single case was badly chosen, for it turned out that she had had a pelvic abscess before." That is certainly brilliant success, and fitted to stamp it as almost harmless. After this, any author who may discuss the question of the safety or not of the operation, will simply be doing a piece of superfluous work. The harmlessness of the procedure (that is, when skillfully done) being conceded, there remains to be considered the best method of operating. There may be room for debate here, and yet not much; for shall we not do right if we follow those whose practice has been one long and unbroken list of successes? Sir James Simpson operated thus: He placed the patient on the left side, and pushed up the fundus with the finger if it was anteverted. He then introduced the metrotome as far as the internal os, sprung the blade, and then withdrew it. It was then reintroduced, with the blade looking to the other side, and discharged in the same manner, thus effecting a bilateral incision. Hemorrhage, if any (and there is often a good deal), was checked by the perchloride of iron, applied with a camel's-hair brush. Dr. Greenhalgh originated a double-bladed uterotome, a very ingenious instrument; and by it a bilateral cut is secured at once, and without the necessity of re-introduction. We agree with Marion Sims that this method of operating is objectionable in this respect, that you cannot tell precisely what you are incising. The metrotome, for instance, is introduced to the internal os, and then the incision is made; but who can tell how far that cut may or may not extend?

569. Dr. Marion Sims cuts the vaginal cervix, first on one side and then on the other, right up to where the vagina joins, with a pair of curved scissors, and with the cervix hooked down, and through the speculum he sees what he is doing. He then, with a little razor-bladed knife (probe-pointed) extends this incision carefully on each side. This is an excellent method. We mean the cutting, in the first place, the vaginal portion of the cervix with scissors. Often when you do this you can get your finger in and dilate the internal os with it. We have used our finger daily in this way, after cutting with the scissors; at other times we have employed tangle tent. We think dilatation after thus

cutting is less hurtful, and probably owing to the depletion involved in incising. There is a pretty general impression abroad that the incising of the internal os is attended with risk. We think the belief has been fed and maintained by the method of cutting from within outward (in the dark), and consequently going too deep. If we adopt the plan of Sims—viz., cutting through the external os, and remainder of the vaginal cervix, with strong curved scissors, and then dividing the rest cautiously up to the cavity of the uterus—we shall occasion little if any evil result. But we recommend cautious dilatation with the finger or tents in the first place, after the use of the scissors.

570. **Evils of Incision.**—These have been little when the thing has been well done. Hemorrhage has been the chief drawback; but then the perchlorid. ferri and rest have rendered it nugatory. Dr. Sims applies it to the wound with a bit of cotton, and presses it up into the cervix with a sponge probang. Rest in the recumbent position for a day or two is recommended, in order to discourage bleeding. A vaginal tampon of cotton, saturated in glycerine, is placed over the other dressing; this induces a watery discharge from the vagina, which Dr. Sims deems beneficial in the way of draining off exudations from the decomposing blood in the original dressing. This vaginal tampon is to be removed, and renewed daily until the suppurating process throws off the dressing from the cervical wound. We are of opinion that this mode of treating the wound is often unnecessary. Painting on a little of the liquor. ferri pernit. is often quite sufficient; but there is another plan that may be tried. After incising, check any bleeding that may arise by means of small sponges dipped in iced water. Under this it will frequently be found to stop. Then put in a vaginal tampon of carbolized cotton or tenax.

Causes of Failure.—The cicatrization of the wound in numerous instances induces contraction to near, if not entirely, the former constricted state. After operating, it may freely admit a finger up to the internal os, yet in a few weeks resist a No. 4 bougie. Where there has been much previous induration of the cervix, this is likely to happen. Some pass the sound occasionally, after the fourth day or so; others use a bougie. We think a small tangle tent the best, but only a very small one to begin with; one that, when fully expanded, will only keep the canal open to the extent produced by the incisions. The woman should rest when it is in, and the medical attendant should return in six hours to see that no pain has been set up by it. We repeat here, what we have before said, that a tent after incision is much better borne than when it is pushed into the narrowed canal of a rigid and unyielding cervix, chronically indurated by the deposit of white fibrous tissue. *There* it will often set up intense pain and fever, the culmination, mayhap, being a metro-peritonitis or pelvic abscess.

571. Dr. Greenhalgh's intra-uterine stem is often very serviceable. In cases where there is much flexion, Dr. Graily Hewitt uses a conical, bulbed, ebony stem, supported by a ring pessary, as previously noticed. In cases of ante-flexion, with not only the fundus bent over in front, but the os pointing in the axis of the vagina, and the vaginal portion of the cervix elongated, Marion Sims cuts the posterior portion of the cervix, instead of the lateral, first with the scissors, and then with the knife, as before. This takes away the preternatural curvature of the canal, and permits both a more ready outflow of discharge and ingress of spermatozoa. In this operation it is necessary to be careful, so as not to cut into Douglas's space.

CHAPTER LXVI.

MENORRHAGIA : METRORRHAGIA.

572. **Excessive Menstruation** is a disorder very frequently met with in practice, and one worthy of careful attention, because if permitted to go on unchecked, it may speedily sap the foundation of the vital powers. In amenorrhœa there may be much bad health, and in dysmenorrhœa much suffering; but here there is a draining away of the life's blood, not seldom to fatal depletion. Women, we know, bear the loss of blood uncommonly well for three decades; still excessive draining induces debility, and other concomitants no less distressing, even when it does not kill.

Causes.—These are well divided into the local and the general, or constitutional. Local causes are, various affections of the uterus, such as a granular condition of its mucous membrane, polypi, fibrous tumors, chronic inflammation, ulceration, carcinoma and epithelioma: then various displacments—versions and flexions, and especially inversion. The presence of a foreign body in the uterus, such as a blood-clot or the débris of an ovum, may also occasion it. Some of these affections excite an over-abundant discharge, not only at the monthly period, but during the interval; and often at the former period the flooding marking the intervals in such cases is fearfully augmented. Congestion of the uterine appendages and ultra-excitement of the ovaries, due, perhaps, to overmuch sexual intercourse, are also causes. The general causes are numerous also: A hydræmic state of the blood; prolonged nursing; the hemorrhagic diathesis; depression of spirits; chronic hepatic, cardiac, pulmonary, and renal disease, Bright's disease—albuminuria—by altering the blood, produces it; and diseases such as small-pox, scarlatina, and continued fever, have been known to herald profuse flooding—in women, too, previously suffering from deficiency. We noticed under amenorrhœa that change of climate sometimes arrested menstruation; it has been observed that, in many cases, it has the precisely reverse effect, of augmenting the flow. Paul first called attention to the fact (Archiv. Gen. de Méd., 1860) that lead-poisoning is a frequent source of abortion, and this has been confirmed by many since, including the author. In such cases, also, it excites to menorrhagia, probably by altering the condition of the blood, and, secondarily, of the ovaries and the uterus.

573. **Treatment.**—There are various remedies for excessive menstruation. In some cases the treatment may be only local, in others general, and in others, a combination of both. If there is a fibrous growth (intrauterine), it must be removed, and the same with the polypi. In carcinoma we can do little; in epithelioma, if seen early enough, we can try removal with the knife or écraseur; and in ulceration we may apply the solid caustic. In climatic flooding we urge the patient back to the old home; and in ovarian cases, we advise continence and moderation. In constitutional diseases we must treat the particular malady in the most approved manner; in anæmia there is the iron and hygienic measures: in lead poisoning, there is the iodid. potass., baths, etc., and so on.

Treatment by Astringents.—These are internal and local. The first include ice, tinct. ferri. perchlor., liquor., ferri pernit., matico, rhatany, tannic and gallic acid, cannab. indica, ergot, etc. By internal astringents we do some little good at times in the way of moderating the discharge; and then such of them as the preparations of iron prove beneficial also by improving the character of the blood; but we secure our object much more efficiently, as a rule, by the topical use of styptics.

574. Dr. Barnes has a high opinion of iron (a solution of the perchloride, formerly noticed), and has obtained excellent results from it; but many fear, justly or unjustly, to throw irritating injections into the womb. There are two risks, not to be despised in connection with these: (1.) You may force the fluid up the Fallopian tubes, and thus kindle mischief; and (2.) you may, if much force be used, split the mucous membrane, and invade the circulation by them. In the one case we might enkindle a fatal peritonitis; in the other, occasion a lamentably sudden death. We are more in favor of the insertion of intra-uterine solid styptics, and some of these we shall notice. First, there is solid nitrate of silver. A small portion, about half the diameter of the ordinary stick of lunar caustic, is inserted by a long tube, about the dimensions of the ordinary sound, into the interior of the uterus. Other astringents may be similarly lodged in the uterine cavity, such as alum, sulphate of zinc, the persulphate of iron in powder, finely-powdered extract of logwood, or a small tent of cotton steeped in the liq. ferri. perchlor. We would recommend, then, the employment of the solid astringent to begin with, as safer than injections, and as often perfectly successful where the flooding is not due to intra-uterine growths. Were one or other of these remedies ineffectual, we would plug the os and cervix uteri, as recommended by Dr. Bennet.

CHAPTER LXVII.

LEUCORRHŒA: FLUOR ALBUS: UTERINE CATARRH.

575. This consists of an increase of the natural discharge from the mucous membrane of the cervix uteri and the vulvo-vaginal glands. A common term is the "whites." It is a disorder of very great prevalence, the practitioner will meet with it fifty times for once that he will encounter a carcinoma of the uterus, or a retroversion during pregnancy. Some writers do not deem it a disease, but view it as only an augmentation of a natural secretion, and indicative of other pathological conditions.

There is a want of unanimity in regard to the source of the discharge (often exceedingly profuse and purulent) in leucorrhœa; that is to say, whether the body of the uterus furnishes part of the supply, or whether it is the cervix chiefly that is concerned. Dr. Tyler Smith who has written ably on this subject (The Pathology and Treatment of Leucorrhœa, London, Churchill, 1855), is of opinion that the glandular apparatus of the cervix, so ably treated of by himself and by Dr. Hassal (see Vol. XXXV. of the Lond. Med. Chirurg. Trans.), is the principal area involved; but others include the mucous membrane of the body of the uterus, and also of the vagina. Doubtless, as shown by Dr. Smith, the glands of the cervix are exceedingly numerous, and probably, therefore, play a very important part; but we must not conclude that the amount furnished higher up is altogether insignificant in quantity. There are some facts which rather lead us to an opposite conclusion. For example, a muco-purulent discharge is often copiously poured out from the cavity of the body of the uterus after the cessation of the colored lochial discharge. (2.) During menstruation, mucus and epithelium are largely mixed with the sanguineous discharge, and both precede and follow it in many cases. At this period the mucus cannot come from the cervix, because its vast and intricate glandular apparatus is supposed to be inactive and quiescent at that time. Moreover, on examining a uterus after death, the mucus and epitheliem have been detected on the membrane of the cavity. (3.) In cases of inversion, the same secretion has been witnessed in the same part of the uterus.

The Fallopian tubes are believed by some authors, such as Hennig, to contribute some of the secretions at times. They are liable to morbid dilatation and catarrh, during which muco-purulent discharge is produced.

As regards the vagina, its lining membrane is bestrewed with numerous follicles, which secrete a mucus of a somewhat different and variegated character. Its secretion, as we before noticed, is acid; and Donné, on examining it by the microscope, found animalcules (trichomonata) interspersed throughout it in considerable numbers. Scanzoni is of opinion that these exist only when a morbid alteration has taken place. Doubtless, when such a condition exists, we have it contributing to the leucorrhœal flow.

In connection with this subject, we may note that children have sometimes a white discharge of the same nature which often rather surprises their parents.

576. **Causes.**—As in menorrhagia, so here we divide the causes into the local and the general, or constitutional.

(1.) *Constitutional.*—We find some females of a plethoric habit prone to this excessive discharge. In these the flow does not seem to put them about in the slightest; on the contrary, it appears to be a relief—a safety-valve—to their system. They have overloaded vessels, and this is a sort of welcome and useful depletion. While plethora conduces to it, the somewhat opposite condition, anæmia, also favors its production. Here there is a deficiency of red corpuscles, an increase of the white cells, and a watery (hydræmic) state of the blood. This condition coexists with, or occasions a weakened and perverted state of the glandular system, and hence the abnormal discharge. Leucorrhœa is also a companion, if not a concomitant, of menorrhagia. In this latter there is atony of the vessels of the uterus; and hence we have an explanation of the other discharge. Frequent child-bearing, by debilitating the system generally, and impairing the tone of the uterus, also promotes this disorder. It has been noticed that residence in low-lying, damp, marshy districts predisposes to it. Prolonged nursing, phthisis, cardiac disease (valvular), frequent abortion, syphilis, and excessive connection, tend to favor and maintain it. The use of strong cathartics and emmenagogues may also be named.

577. (2.) *Local Causes.*—The local causes are diverse and plentiful. We can do little more than enumerate them. They are—Congestion of the Fallopian tubes and of the uterus; inflammation and ulceration of the cervix; intra-uterine growths, such as polypi and fibrous tumors; induration and hypertrophy of the uterus, and cancer and corroding ulcer of the same. The different displacements of the uterus, versions, flexions,

prolapsus, and inversions, are also causes. Vaginal rectocele and cystocele, and laceration of the perinæum, also predispose to it. The irritation caused by masturbation and too frequent sexual intercourse, as well as by the lodgement of various hard pessaries in the vagina, is a frequent source of the flow. The same is true of irritation of the neighboring canal, the rectum, by the location of worms, indurated fæces, hemorrhoids, fistula, fissure, and cancer. Irritation of the bladder by stone, etc., as well as of the meatus by the little painful vascular tumor occasionally met with, also predisposes to the affection. Some of the most obstinate cases are due to the small vesicular uterine polypi.

Diagnosis.—We know it by the white or yellowish-white discharge coming away, and, on examining by the touch and speculum, finding no marked uterine disease present. From gonorrhœa it is sometimes not easily distinguished; only in this contagious affection the discharge is usually more purulent and darker in color, and there is more vaginal heat and pain. There is more pain also during intercourse, and on passing water.

578. **Symptoms.**—There is an acute form (but it is not often met with) where there is a good deal of utero-vaginal heat and pain, weight in the pelvis, dragging pains in the loins, down the thighs, and over the sacrum; and there may be frequent desire to pass water, and difficulty in making it.

The usual form met with, however, is the chronic; and here we have often few symptons of any importance at all. Back pain—sacro-coxal, and sometimes extending up the back—is common, with down-bearing at times, and a little heat and itching of the genitals. The woman is often languid, looks pale and haggard, and there is a dusky circle around the eyes. Headache, vertigo, palpitation, and fainting are not uncommon in severe cases.

Treatment.—In the acute cases, leech or scarify the uterus, and then throw into the vagina injections of warm water. Give a saline purgative, and afterward insert into the rectum suppositories of morphia. There is a caution to be noted with respect to the little local bleeding. Don't employ it within a week of the menstrual period, in case of repelling that flow. For vesical irritation, give some hyoscyamus, camphor, and buchu, or pareira, by the mouth; and inject into the bladder ½ grain of morph. hydrochlor., in mucilage. An opium or balladonna pessary in the vagina will also soothe a little.

As regards the ordinary chronic form, the treatment is different. We must keep the constitutional state in view. Is there a phthisis, a cardiac affection, anæmia, the syphilitic taint, etc.? If so, we must first grapple with these maladies in the most approved and efficient manner. Have we any drugs that act as tonics (either direct or indirect) to the uterus? We think so, and that guaiacum, in particular, is one of them. Give the powder in 15-grain doses, along with 5 grains of ergot, twice a day. This will soon tell favorably. Balsam of copaiba confers speedy benefit, but it is apt to cause nausea, and pain and irritation of the stomach and intestines, and it has a vile odor, and occasions an equally bad erucutation. Cubebs is less offensive, but hardly so effectual. Buchu, uvæ ursi, Canada balsam, and tincture of benzoin help a good deal. Mastische has now got into disrepute. The various preparations of iron are, of course, essential in anæmia; but in plethora we must ply the saline cathartics, and enjoin moderate diet and hard work.

579. But while internal remedies are to be carried on, of equal import-

ance are the various local applications. It is common to use injections of oak-bark infusion, sulphates of alum and iron, logwood, sulphate of zinc, acetate of lead, nitrate of silver, matico, catechu, tannin, etc. Well, these are all of service where the discharge is chiefly from the vagina, but in uterine leucorrhœa (whether cervical or from the body and fundus), it is obvious that they can be of little avail, for they do not reach the part. To be of service, we must get them applied within the uterus. Injections of cold water into the vagina do good, although they do not reach the source and seat of the discharge, directly at least. The cold lessens uterine congestion, and increases the contractility of the uterine vessels. Much good is often done by change of air, by the shower-bath and the sitz-bath. Counter-irritation over the sacrum is also of eminent service. We may effect this either by cantharides (a blister), or iodine, or croton oil diluted by 8 parts of olive oil. For the back-pain, an opium plaster may be employed; it is more soothing than belladonna. Pessaries of tannin, gallic acid, etc., help. Pledgets of lint, dipped in a solution of permang. potass. and carbolic acid, are also serviceable. Iodine, given internally and applied over the sacrum, and in the form of tincture, to the cervix, has its panegyrists. Certainly, if we have a chronically hypertrophied and indurated uterus, it will help to reduce it. Corrosive sublimate will also be found useful in these circumstances. The bromide of potassium should be kept in mind if there is an ovarian or Fallopian cause; and the condition of the rectum and bladder should not be overlooked. Flexions and versions must be rectified if possible. The bowels should be attended to, and the liver likewise. Keep them moving and acting normally by means of rheum, taraxacum, or podophyllin.

580. If the discharge were due to polypi and other growths, we would not look for amendment until these were removed. When the os uteri is studded with granulations, the application of caustic or dried alum is beneficial. The acid nitric of mercury is also very serviceable—topically applied. Care must be taken so as not to injure the vagina or other parts with it. Probably the most effectual way to deal with a chronic leucorrhœa, which we deemed it advisable to cure, would be this: Give ergot and guaiacum internally (with iron in anæmia), and touch the interior of the uterus with nitrate of silver. Throw cold water twice a day into the vagina, and apply counter-irritation over the sacrum. There is one precaution we should have noted in regard to cauterizing the cervix. First dry the surface of its lining membrane with lint, if you can get at it, otherwise the strength of the caustic will be expended on the secretion.

Are we justified in Curing a Chronic Leucorrhœa?—This depends on circumstances. In plethoric women with engorged vessels, and where the flux was evidently useful, it would be an error to arrest it; just as we do not heal up every ulcer we meet with, or stop every epistaxis that we may encounter. In anæmic, debilitated women, with haggard appearance and tendency to palpitation and syncope, the sooner we lay an embargo on it the better.

CHAPTER LXVIII.

ON SOME DISEASES WHICH COMPLICATE PREGNANCY: CHOREA, PARALYSIS, ETC.

581. **Chorea.**—This convulsive affection has occasionally been met with during pregnancy, but the instances are rare. It usually sets in from six to eight weeks after conception, and may disappear before the termination of pregnancy. The cases reported do not show that it is a dangerous complication of the gravid state, although the involuntary movements, often powerful, and the irritation on which they depend, may occasion an abortion. This has been observed in some of the cases. The contractions—the jerking movements—are usually bilateral, and largely confined to the muscles of the face and the upper extremities.

There is often severe headache, a proneness to forget recent occurrences, some imperfection of articulation, and an apprehension of some impending danger.

Causes.—In general there has been a history of rheumatism, but other cases, where this could not be made out, were conjectured to be due to irritation of the uterine system. In some instances the attack was just a repetition of previous seizures occurring in earlier life, perhaps before puberty.

582. **Treatment.**—Attention should be paid to the bowels; they should be kept freely open; and the liver may need a filip from a little podophyllin, the severity of this drug being moderated by a little henbane or belladonna. Ice to the spine—cervical region—and dry-cupping, have been found beneficial. Alkalies may be given if there is evidence of a rheumatic diathesis, but arsenic had better be withheld. A little valerianate of zinc may be tried; and other anti-spasmodics, such as valerian and assafœtida. If the case were obstinate, we would vesicate the nape of the neck, and apply sinapisms in different parts of the body. The bromide of potassium will be found to calm irritability and moderate the severity of the spasms. Were we to view it, with some of the speculative French writers, as cerebellar, we would administer nerve-tonics, such as moderate doses of strychnia. The older writers, viewing it as based on debility, plied their patients with chalybeates. Are these admissible during pregnancy? Many object to them, and view them, in fact, as hurtful, and likely to cause abortion and other evils. We never saw any harm accrue from the employment of the lighter preparations of iron during gestation.

583. Ether spray (Richardson) has been applied to the spine with benefit. It operates in the same way as the ice-bag of Chapman. Another drug must be named here, as having apparently been of service, viz., the much-run-upon article, chloral. Dr. Carruthers reported a successful case in the *Lancet*, April, 1870. We shall reprint part of the doctor's account. He says: "The patient was a young girl, aged fourteen years, who had chorea for fully two years, characterized in her case by the irregular motions of the disease going on during sleep. She was under my care at the first accession of the disease, and was treated by regulation of the bowels, cold douche, arsenic, iron, etc. These only

alleviated the symptoms a little. After this she consulted many eminent men, but with only partial success. Early in January, I was summoned to see her during the night, and found all the irregular and tremulous motions, so characteristic of the disease, going on; and her parents told me she had fainted when they sent for me. I ordered her half a drachm of chloral, and in ten minutes after taking the medicine all the motions ceased. She slept twelve hours very quietly, and, on awakening, spoke more distinctly than she had done for some time. By taking a similar dose for a fortnight, all irregular movements ceased, and she now sleeps quietly, walks steadily, speaks distinctly, and is only slightly unsteady when writing. I may mention that the catamenia had never appeared in this case. She is continuing the chloral in eight-grain doses every night, and, in addition, three grains of valerianate of iron twice a day, cold douche, and exercise in the open air."

584. **Paralysis during Pregnancy and Labor.**—Various forms of paralysis, such as paraplegia, hemiplegia, facial paralysis, and amaurosis, precede and accompany labor at times. Albuminuria and uræmia co-exist as a rule with such cases, and in all probability help to produce the affection. Some cases of paraplegia may be due to pressure on the sacral plexus, etc. When this form of paralysis is thus occasioned, its production is usually preceded for some time by cramps in the lower extremities. Cold would appear to have induced the affection in other instances.

Paraplegia: its Influence on Gestation and Labor.—Many cases are recorded where this form of paralysis occurred during pregnancy, and gradually passed off after delivery. Labor has also proceeded pretty well during its presence. An interesting case was reported by Dr. A. Farre, in the Cycloped. of Anat. and Phys., article "Uterus," p. 676: "A woman was attacked with paraplegia in the 8th month of pregnancy. She had neither sensation nor motion in any part below the umbilicus. No reflex movement whetever could be produced by tickling the soles of the feet. The fæces passed involuntarily, and the urine was drawn off daily. About the 9th month, her medical attendant, when about to pass the catheter, found a full-grown fœtus in the bed, dead. The uterus was contracted and the placenta in the vagina."

Scanzoni reports a case in his Lehrbuch der Geburtshülfe, p. 1000. This was a female who conceived while suffering from paralysis of the lower extremities. Pregnancy increased the palsy, but she went to the full time, and was delivered of a healthy child.

Unless there be organic disease of the kidneys, etc., or embolism, untoward results do not usually come to pass. Sometimes a permanent lameness is entailed.

585. **Hemiplegia.**—There are some females who suffer regularly from attacks of hemiplegia during gestation, and recover from it again at the termination of the gravid period. We have met with such cases, and many of them have been reported from time to time. There is one case in particular which we had occasion to treat, which occurred in four successive pregnancies. The lady recovered well until the last pregnancy, when she succumbed to cardiac disease, two days after labor. Labor often progresses satisfactorily, the action of the uterus being unimpaired. Apoplexy, however, may result; or if albuminuria exists, convulsions may supervene. At times, the paralysis sets in after a tedious labor or a flooding.

586. **Amaurosis.**—This local paralysis has been observed to occur

during pregnancy, and both during and after labor, in numerous instances. Beer, in his Lehre der Augenkrankheiten, records the case of a Jewess who, in her first three pregnancies, grew blind always at the beginning of pregnancy. She recovered her sight after delivery, until the last time, when permanent blindness set in. The late Dr. H. E. Eastlake of London reported to the Lond. Obstet. Soc. the case of a female who was amaurotic after labor eight times in succession. In this case there was no albuminuria, and her labors were not difficult or complicated. She usually recovered her sight from three to five weeks after labor.

587. We have met with several cases of amaurosis in our own practice. They both occurred immediately after an ordinary labor; but both females were delicate, anæmic, and suffered from albuminuria. One of them recovered her sight a fortnight after labor, the other became permanently blind. As regards the causes of the amaurosis in these cases, some are of opinion that it is due to congestion of the head, arising from straining, etc. Our own cases do not support this opinion, but would rather seem to favor the view of a deficiency of blood in the ophthalmic arteries, and consequent impairment of the optic discs.

Facial Paralysis.—Numerous cases of this form of palsy have been reported. It does not interfere with gestation, and often passes away in a week or two.

Treatment.—In the treatment of these various forms of paralysis we are guided by the causes. It is very probable that not a few of them are due to toxæmia, and often that kind indicated by albuminous urine. If we meet with a grave albuminuria, we must combat it in an efficient manner, as noticed in a previous part of this book. By curing it, or moderating it, we may avert some of these palsies to which we have just referred. It hardly belongs to us to touch on the various means and remedies to be employed in paralysis, these being amply detailed in works on the practice of medicine.

588. **Jaundice.**—We have now seen several cases of this malady during gestation. These occurred toward the latter period of pregnancy, and were probably due to pressure on the gall duct. In one case this pressure was very great, it being a plural pregnancy, with a large quantity of liquor amnii. This case went to the full time, but the other miscarried, about a fortnight after the jaundice appeared. The child was dead. Some cases happen at an earlier period, owing, as is pointed out by Churchill (who gives an excellent account of the disease in his work on Diseases of Women, 5th ed., p. 642), and others, to reflex influences—sympathy between the uterus and the chylopoietic viscera. This form is less injurious, more amenable to treatment, than that arising from compression and other causes, and usually passes off again in a short time. Coma has sometimes supervened and proved fatal. There was an epidemic of jaundice in the Island of Martinique in 1858, which attacked pregnant females largely, and caused death in many cases. Jaundice, concurring with pregnancy, is more common in America than in this country.

Abortion is a frequent result in icterus during pregnancy, and, as we have seen, a fatal termination may come about. Those cases occurring early, and being reflex, are like to do best.

Treatment.—We cannot resort to very active treatment during pregnancy, but the liver may be acted on by moderate doses of pil. hydrarg.

or podophyllin, etc. The female should rest a good deal on her left side, if we think the disease due to pressure.

589. **Eczema of the Vulva.**—This is by no means an uncommon affection, and we have seen several cases where it occasioned no little distress during pregnancy, and also some impediment during labor. It is common for it to attack the labia, the space between these and the thighs, and along the perinæum. We have seen a chronic case (and it is very apt to grow into this form) apparently interfere with the elasticity of this latter, and conduce to laceration. In the non-gravid state, it is frequently much aggravated during menstruation.

Dr. West mentions (Diseases of Women, 3d ed., p. 652) that in two instances of severe chronic eczema, a vascular tumor of considerable size grew from within the orifice of the urethra.

In some cases the vaginal orifice is narrowed by the affection. Distressing itching and smarting pain are experienced.

Causes.—There is frequently a strumous or syphilitic basis, or both. Exciting causes are irritating discharges from the uterus, vagina, and bladder.

Treatment.—Some paint on a solution of nitrate of silver, 20 grains to the ounce of water. This relieves at times. Scanzoni used a solution of caustic potass, 30 grains to the ounce, and frequent application of cold water. Glycerine subdues the itching a little. We have found the following ointment of service: Tannin, a drachm; dilute nitrate of mercury ointment, 2 drachms; camphor ointment, 6 drachms: mix. Before using this, a poultice of linseed meal or turnip, should be applied.

We lay stress on internal remedies also when the case is chronic. Give the female, three times a day, a tablespoonful of the following mixture: Potass. iodid., a drachm; Ferri ammon-cit., 2 drachms; liquor. arsenicalis, 36 minims; infus. gentian co., 6 ounces: mix.

590. **Pruritus of the Vulva.**—This is viewed by many writers as a nervous affection. Scanzoni deems it a hyperæsthesia of the sensitive nerves of the vagina, due in many cases to diseases of the uterus, ovaries, and vagina. It is noticed frequently in connection with congestion and flexions of the uterus, and with ulceration and malignant disease. When the uterus begins to develop at the earlier months of utero-gestation, and previous to and during menstruation, it is frequently experienced. It co-exists with a varicose condition of the labia, with hemorrhoids and constipation, and is aggravated by these. Congestion of the sexual organs, from whatever cause, is liable to produce it.

Symptoms.—Most distressing itching, and smarting pain. It is usually aggravated by warmth, so that when the female enters a warm apartment, or goes to bed, it becomes intolerable, and she has to scratch and tear until the blood flows.

Treatment.—The first thing to do is to discover the cause, and cure it, if that be possible. If it depend on congestion of the external parts, leeching is of service; at the same time, saline purgatives may be given. If hemorrhoids, or fissure, or fistula are present they must be treated in the appropriate manner. Good is done, where the cause is ovarian, by the internal administration of bromide of potassium. This also helps where it depends on uterine congestion. Ulceration of the os must be cured; but in cancer we can do little. Here the pruritus is kept up alike by the disease and the discharges that flow from it. There are a multitude of lotions given, but they only palliate a little if the affection depends on disease of another part. Where it is due to herpes, they will early confer benefit and effect a cure. As regards the various applications, a solution of nitrate of silver may be tried; or an ointment (our own), consisting of the following: Plumbi acet., gr. xxx.; borax, a drachm; ung. hydr. nit. M., 2 drachms; ung. camphor, 6 drachms; acid. carbolic, 8 drops: mix. Scanzoni recommended a liniment of chloroform and olive oil (1 part of the former to 16 parts of the latter), to be applied both to the affected parts and the walls of the vagina. There is a useful lotion given in Dr. West's work—viz., borax, 4 drachms; morph. hyd., 8 grains; rose water, 10 ounces: mix. Quinine may be tried; and a pill of extract hyoscyam, 3 grains; camphor, 2 grains: mix.

591. **Vaginismus.**—We have been consulted frequently both by men (!) and women in regard to this painful, spasmodic condition of the vagina. The men we allude to were the husbands of women suffering from the affection, not long married, and beclouded about the countenance because they thought there was something greatly wrong and unnatural about their better halves. In this affection there is a spasmodic stricture of the sphincter vaginæ, and the introduction of the finger for the purpose of examination occasions intolerable pain. Coitus is impossible so long as it lasts. All the cases that have come under our notice have been those of newly-married women, some of them hysterical, and rather up in years. Dr. West has seen it "left behind after chronic uterine inflammation," but he believes it to occur generally in nervous and hysterical females. It is frequently associated with irritation of the bladder, and micturition is painful and difficult. In some cases we are certain that vaginitis has co-existed with it, as pointed out by Dr. Churchill.

592. *Treatment.*—Intercourse must be abstained from at once. Tepid hip-baths are to be given, and morphia and belladonna pessaries inserted into the vagina. They must be made firm, and as narrow as a goose-quill, because the orifice is so much contracted. Good is done by applying a belladonna plaster over the sacrum, and giving the bromide of potassium and Indian hemp internally. Churchill recommends the application to the whole vaginal mucous membrane of a solution of nitrate of silver. Often we shall have to dilate the vaginal orifice by means of large bougies, enlarging the size gradually. Besmear them well with belladonna ointment before their introduction. Marion Sims, who has directed special attention to this spasmodic affection (and who first termed it vaginismus), proposed an operation for the more rebellious cases. This consists in excising the remains of the hymen in the first place, and then of the vaginal orifice; afterward dilating the canal with bougies. Dr. Sims uses glass dilators as the most cleanly. Hemorrhage to a considerable extent may take place, but it can be checked by ice and iron.

CHAPTER LXIX.

COCCYODYNIA, OR NEURALGIA OF THE COCCYX.

593. This back-pain is a not uncommon ailment in child-bearing women. It is usually a neuralgia, and affects the lower part of the sacrum and coccyx.

594. *Causes.*—Sometimes it is due to retroversion; at other times it would appear to be owing to ulceration of the os, and leucorrhœa. Sometimes it has set in after a tedious labor, or the application of the forceps. It co-exists with ovarian disease at times, and with affections of the rectum, such as hemorrhoids and cancer. Scanzoni has given an admirably full account of it in his Lehrbuch, p. 589. Of twenty-four cases of which he had a record, nine first complained of it in childbed. Six of these were primiparæ, and five of them had required the application of the forceps. Two attributed the ailment to long riding on horseback. Thus direct injury would seem to be a common cause. Hyrtl, the anatomist, found that out of 180 coccyx bones that he had collected in two years, 32 showed evidences of dislocation and subsequent anchylosis. There are therefore reflex causes, and direct or traumatic ones.

595. **Symptoms.**—Pain, aggravated on pressure, is felt at the lower part of the sacrum and at the coccyx. On pressing the latter bone upward, the pain is much aggravated, and it is often, indeed, very acute. Pressure backward, by the finger introduced into the vagina, does not increase it so much. The sedentary posture also augments the pain, and defæcation much so.

Treatment.—We must endeavor to find out the true cause of the pain, and see to its removal. Is ovarian disease present? If so, treat it efficiently. Hemorrhoids, or other rectal disease, must also be cured or mitigated. Leeches have been applied in some cases with benefit. In the neuralgic form, suppositories of morphia, and pessaries of opium and belladonna, relieve. An enema of chloral might also be tried. Scanzoni obtained much benefit from the subcutaneous injection of morphia over the coccyx. Blistering this part, and applying belladonna and opium to the vesicated surface, confers much relief. The bromides of quinine and morphia, as recommended by Dr. Richardson, might be tried. In obstinate cases, the late Sir James Simpson recommended, and successfully practiced, the subcutaneous division of the muscles, ligaments, and fasciæ connected with the lowest part of the coccyx. This sets the coccyx free and at rest, and thus contributes to the relief of pain, and cure.

We should not omit to state that the bowels should always be kept regular, constipation obviously aggravating the ailment. Rest in the recumbent position is also of service. In some inveterate cases, the bones of the coccyx have been extirpated. Sir James Simpson performed this operation; but it appears to have been first done by Dr. J. C. Nott, of New York. Dr. Nott performed the operation so far back as 1844. He does not think it an infallible procedure, having, as he says, met with cases where it failed. The same is true of the subcutaneous incisions.

CHAPTER LXX.

FLOATING AND ENLARGED KIDNEY, SIMULATING AND COMPLICATING PREGNANCY.

596. We have met with several cases of floating or movable kidney, which occasioned an abdominal tumor of considerable dimensions. In one of these cases it crossed the middle line, and appeared not unlike a uterus enlarged to about the size of a six months' pregnancy. In this case the lady has been pregnant on three occasions, but has aborted each time. On the first occasion she carried the child to the end of the 6th month; on the second, to the 4th; and on the third she parted with the ovum at the end of eight weeks. In the other case the right kidney is much enlarged, and approaches the surface of the abdomen, but the female, though married, has never become pregnant.

Dr. Priestly, in the *Medical Times and Gazette*, for 1857, vol. i., p. 262, says that he believes that some cases of spurious pregnancy are just instances of movable kidney.

Cruveilhier (Anat. Pathol. Générale, vol. ii., p. 723), noticed these kidneys, and observed that it was usually the right that was mobile. Our own cases were such. In some cases, where there is the entire absence of one or other kidney, the remaining one is much enlarged, and may bulge so as to simulate pregnancy. It may also seriously encroach on the abdomen, and by interfering with the development of the gravid uterus, help to induce abortion.

597. Cystic kidneys have been met with of forty pounds' weight, and distending the central part of the abdomen. Such a case would be incompatible with the natural progress of utero-gestation. It hardly belongs to us to point out that such dilated kidneys have deceived the most experienced authorities, who have imagined them to be examples of ovarian dropsy. Mr. Spencer Wells has reported cases where the kidney was so much enlarged as not only to fill the abdomen, but to encroach also on, and descend into, the pelvis. In some cases the kidney has had assigned to it a special mesentery, which has contributed to its mobility.

The spleen may also enlarge so greatly as not only to give an appearance of pregnancy, but also to arrest its progress, and induce abortion.

Some have been led to confound the movements of a floating kidney with those of a fœtus.

Diagnosis.—An examination per vaginum will help to tell us whether pregnancy exists or not, and it is not often that we can be cheated by an enlarged or floating kidney. It may be confounded with tumors of the mesentery or omentum, and with ovarian and splenic disease.

The *Treatment* of movable kidney is just by bandaging. A plaster or a pad may be placed over it, and over this a binder. During pregnancy the woman should lie a good deal on the side opposite to that in which the vagrant kidney is situated. The bowels should be kept open, and the erect posture avoided as much as possible.

CHAPTER LXXI.

ON MATERNAL IMPRESSIONS AS A CAUSE OF FŒTAL DEFORMITY.

598. When children come into the world misshapen and deformed, having parts resembling those pertaining to some of the lower animals, it is common to attribute the deviation to some strong impression made on the mother during the period of pregnancy. We have not space to enter upon the bearing of the psychical on the physical, but must content ourselves with the insertion of some cases which have been reported, and which support the opinion that fœtal deformities may be due to strong impressions made on the mother during the earlier months of utero-gestation. The first case is one by Mr. Child, M.R.C.S., reported in the *Lancet* for September, 1868. He says:

"On the 26th of August last I was summoned at 11 P.M. to attend Mrs. A—— in her first labor. On arriving at the house, I found the pains very lingering and slight; the os was dilated to the size of a sixpenny-piece. I could not detect the presentation. Finding I should not yet be wanted, I returned home, telling the nurse to send for me when the pains came on stronger. At 6 A.M. the following morning I was called up. The labor was progressing, and the breech presenting. It continued to do so until 4 P.M., when as soon as the breech passed the os externum, the whole body of the child was expelled with some degree of force. It was dead, and from the peeling of the skin I concluded it had been so for some time. When I touched the cord, it came away in my hand, leaving the placenta *in utero*, which I extracted after a little manipulation. It was a fine, full-grown male child, formed naturally as to its body, with the exception of the nails on the thumbs, which were like those of a rabbit. On examining the head, I was surprised to find the parietal, frontal, and part of the occipital bones wanting; and at the space corresponding to, but larger than the anterior fontanelle, was the brain, entirely denuded of skin or membrane, not even being covered with arachnoid. There was a little hair over the eyes, none elsewhere. The eyes, palate, and tongue were similar to those of a rabbit. At first I was inclined to think that in the absence of these bones the action of the uterus had squeezed the eyes into the shape I had found them; but on making inquiries as to any fright, and having heard the following story, I was induced to consider it a case of maternal impression:

"During the 2d month after conception the mother went to a penny show, in which she saw a trained horse pull the trigger of a pistol, pretending to shoot a rabbit. A dummy was then thrown out; the back of its head was bleeding, having to all appearance been shot off. This corresponded, as the mother-in-law declares, to the mark on the child's head. My patient seems never to have forgotten the circumstance during the remainder of her pregnancy, and was considerably frightened at the time. I was lucky in having to contend with a breech presentation; if it had been a natural one, I should either have been puzzled to ascertain what it was, or perhaps have inadvertently pushed my fingers through the brain itself. The mother did well, and is now quite recovered."

599. The next is one reported by Dr. J. W. Metcalf of Geneva in the *Lancet* for December, 1865. He says:

"A case has recently occurred in my practice here, the facts of which are valuable as bearing on the effect of maternal impressions during pregnancy.

"A lady, of highly nervous and excitable temperament, was, when in the 4th month of her sixth pregnancy, at a railway station addressed by a man who persistently placed his face near her, much to her annoyance, this person having lost the nose, and being a repulsive object. At the time, and up to the day of delivery, which was at the 8th month, my patient had many times expressed to her husband and others a fear that the child would be affected, she being the more anxious, owing to indescribable feelings at the time she was spoken to. Besides being premature, the labor was long, lingering, and distressing, followed by very severe flooding. A well-formed female child was born, well made in those parts not affected. There was double hare-lip, the palate cleft on either side of the median line, the nose malformed, a sixth rudimentary finger on the left hand joining the little finger, and a sixth perfect toe and nail on the left foot, whilst the right foot was somewhat distorted. The mother's exclamation, before knowing the state of the child, was, 'It will be deformed.' Nor was she surprised when learning the truth, saying only, 'I expected it.'

"Knowing all the facts of this case before the confinement, as well as the person whose unfortunate appearance caused so strong an impression on the lady, I give these details without the accompanying doubts that usually hang over some parts of similar accounts."

A third case we shall mention is recorded by Dr. J. Slack Steel of Salford in the *Lancet* for 1865. His account thus runs:

"I was called to attend Mrs. C—— of this town on the afternoon of the above day. There was nothing remarkable about the labor, which was completed in a few minutes after my arrival; but upon examining the child's left hand, there was a deficiency of all the fingers and thumb, and in their place small bended pieces of integument like small toes, two of which had perfect nails.

"On questioning the mother, she distinctly recollected during the early part of her pregnancy a beggar man coming to the door, and as soon as she opened it, he drew his hand, destitute of fingers, suddenly out of his coat, and held it up before her, which gave her such a fright that she was some time before she got over it. She said it was the man's left hand.

"I have met with several cases of acephalous fœtuses and spina bifida, but in none could I trace mental emotion as a cause of bodily deformity where the facts were more conclusive than in this."

Lastly, there is one by Dr. F. H. Daly, in the *Lancet* for February, 1869. His description is as follows:

"At three o'clock on the morning of the 4th of June, I was summoned to a lady, my partner's patient, he being unwell. On examination, I found the os dilated to about the size of a crown piece, the membranes not ruptured, and the pains frequent and severe. I could not make out what part was presenting, but was certain it was not the head. I waited for a little time, and when the os became more dilated, ruptured the membranes, when I found that it was a transverse presentation. I, therefore, immediately passed my hand into the uterus, got hold of both the feet without any force or difficulty, and turned the child. The next pain completed the birth. The child was dead, and evidently had been so for some days. My patient at once inquired 'if it were dead?' and when I told her it was, she asked 'if it were all right?' I, of course, only told her to keep quiet, and wrapped the child in the flannel; but she again persisted, 'Has it got any mark like a rat?' I said I would see. When the mother was made comfortable, I took the child into another room, and examined it. It was a most horrible monster. The body and limbs were natural; but there was no neck, the head being placed immediately between the shoulders, with the face upward. The resemblance to a rat was most striking. The maxillæ were prolonged, and terminated in an exact snout, the nose, mouth, and tongue being precisely like those organs in the rat. There was no rotundity of the cheeks, or prominence of forehead; but a prolonged cone-shaped snout, looking upward, attached directly above the sternum.

"On questioning the mother, she informed me that at the time of the conception, and for about three months afterward, she lived in a house infested with rats. To use her own language, 'Wherever she turned she saw a rat, and always said the child would be marked.' Unfortunately, I was not permitted to retain the monster, nor indeed to see it again after my first examination.

"The patient recovered without a bad symptom. She had previously been the mother of several fine healthy children."

CHAPTER LXXII.

ANÆSTHESIA; CHLOROFORM, ETC.

600. The ancients were in the habit of administering various narcotics for the purpose of mitigating pain; but the idea of assauging, or even entirely banishing, the pains of labor took practical shape only thirty years ago. Sir James Simpson was the bold pioneer in this work of mercy, having administered ether to a parturient female at that time. His words are: "The first instance in which the practice (that of inducing anæsthesia during labor) was adopted, occurred in my own practice in Edinburgh, on the 19th January, 1847. The case was one of deformed pelvis, in which I had pre-determined to extract the child by turning, and to try the inhalation of ether vapor upon the mother, with a view to facilitate that operation. During a week or two previously I had anxiously waited for the supervention of labor in this patient, for, by the result, I expected that much would be decided in regard to the effect of ether-inhalation in parturition. Would it merely avert and abrogate the sufferings of the mother, without interfering with the muscular contractions? Or would it arrest simultaneously both the contractions of the uterus and the sufferings that arise from them?" (Obstet. Works, vol. ii., p. 632.)

This case proved to Sir James that the pains could be abrogated, without interference with the muscular contractions. He brought it before the Edin. Obstet. Soc. at their meeting on the following day. A week or two after, his experience having increased, he stated to the same Society various conclusions which he had arrived at on the subject, and which subsequent experience for the most part confirmed.

601. We may now state that Sir James Simpson was led to employ this substance by hearing of its success in America. In that country several medical men had been using it with success, viz., Dr. W. T. G. Morton, Dr. Horace Wells, and Dr. Charles T. Jackson; but to the first-named gentleman seems justly due the fame of having preceded the others in its employment. This occurred on the 30th of September, 1846, the operation being the minor one of tooth-extraction.

Chloroform.—Some disadvantages attaching to the use of the ether, such as the quantity, and the time required for its due operation, the the restless and searching mind of Simpson was bent in quest of another that might happily be more convenient and potent. Chloroform was tried, and found to possess the wondrous power. Sir James practiced on himself, and sent Keith and Duncan into dreamland with it, as is now known throughout the world; and the late lamented James Miller described with graphic power the scene in the dining-room when the young doctors floundered and tossed under it, and were prostrated by its resistless power.

It was on the 8th of November, 1847, that Simpson first employed it in a case of labor. Soon after he made known its wonderful properties to societies and through the press, and its fame got speedily wafted to distant lands. Now it is so well known that a long account of its properties, etc., is quite unnecessary, and we shall content ourselves with noticing some of its uses and advantages in obstetrics, *where* it may be, and *when* it may *not* be administered.

602. **Advantages of Chloroform.**—In natural labor, chloroform is not often administered, unless it may be during some of the more severe pains of the second stage. At such a time, although everything may be proceeding naturally and normally, there is no objection to using it, in order to alleviate, if not abrogate, the refinedly severe suffering. It was wont to be held by some that the pains of parturition were not injurious, but few, we should suppose, will now maintain that opinion. Pain, most assuredly, is a great shock, and conduces to exhaustion; and if it has been intense in any particular case, there is likely to be a more tardy recovery. The shock of operations, as is well known, has proved sufficient to destroy. In mitigating the pain of natural labor, then, the chloroform subserves a useful function; and, doubtless, its employment in such cases has helped to diminish mortality. At the same time, if the case goes on rapidly, and is not attended with much suffering, little need be given.

In labor rendered tedious by a rigid and undilatable os, we obtain great service from this drug. It not only contributes vastly to relaxation, but enables us to adopt other measures for the purpose of dilatation in extreme cases of induration, and without inflicting an increase of suffering on the woman. Under its blessed power, careful manual dilatation may be painlessly and successfully carried out, and thereby, in some cases, the more doubtful operation of incision avoided.

603. But it is in operative midwifery that its greatest value is seen. How helpful, for instance, in version! How serviceable in forceps cases and in the sad operation of embryotomy! In version, more particularly, has it proved of inestimable utility. Formerly—that is, before its introduction—this operation was often debarred by rigidity of parts, by a tetanically contracting uterus, and the destruction of the child was in consequence necessitated; now we are enabled to brush these obstacles aside, and to bring home living infants, that in pre-anæsthetic times

would have been *inevitably* sacrificed. As before remarked in this work, we have performed version in a multitude of instances without the shadow of evil result to the mother; but we are quite convinced that had we operated in days prior to the time when our late warm and lamented friend Simpson (too early gone to the silent land) introduced anæsthesia into obstetric practice, we would have slain many more children, and, mayhap, not a few mothers.

We have referred to the relaxant effect of the chloroform on the os, and we must now remark that, in numerous cases, it is of excellent service in slowly dilating perinæum. Most practitioners who have, in the absence of skilled lady-doctors—a crop of whom, by the way, is now flourishing, even under adverse influences, in the city where we write—most practitioners, we say, who have supported perinæums for any length of time will be able to testify to the relaxation which the anæsthetic brings. It saves the doctor no little precious time; but what is of vastly more consequence, it spares the woman no little exhausting effort and pain.

604. In some cases where the pains have been irregular, and of a short, inefficient teasing character, the anæsthetic is often of great service. Under it they become more regular; and sometimes the female, when not fully under its sway, will exert more of voluntary effort.

Does Chloroform interefere with Uterine Contraction?—Sometimes it does; at other times, and singularly, it promotes the contractions of the uterus. It rarely, indeed, arrests the pains entirely, or occasions uterine inertia, but frequently it dimishes the frequency and force of the pains. When such is the case, it is better to desist from its employment. In some instances we have found it to lay a most effectual embargo on the contractions, and we have been obliged to resort to oxytoxics in order to rouse the uterus to renewed effort.

Risks and Disadvantages of Chloroform.—There are sometimes sickness and headache occasioned by its employment, and women will occasionally say that they have "felt rather strange about the head" since it was given to them. It induces on the whole, however, very few after-ills.

605. Dr. Richardson, who originated the ether spray, and many other things of much utility to the profession, delivered, in London, some years ago, an excellent lecture on death by chloroform. He says that there is only one disorder which renders the administration of it dangerous, viz., a heart with the right ventricle dilated. In a case where this condition was present, he refused to give it; but the patient, having had it administered by another man, either less skilled or less scrupulous, perished. This condition of the heart was also pointed out by Sir James Simpson as a contra-indication. Dr. Richardson also tendered some excellent hints in regard to certain precautions contributing to safety, He laid much stress upon the effects of temperature and barometric pressure in determining the quantity of chloroform vapor that would be diffused in the air. "He advised that the tempertature of an operating room should be raised to 65°; that the preliminary fast of the patient should not exceed three hours in duration; that the last meal should be fluid, or semi-fluid (milk and beef-tea, with an admixture of grated biscuit, was recommended); that a little alcohol should be given shortly before inhalation, purely for the sake of its influence upon the mind; that the recumbent or semi recumbent posture should be enforced, and that, whichever was selected, the patient should not be moved about

during the inhalation; and lastly, that, as a rule, the administration should be rapid. He referred to the manner in which chloroform is resisted by men of great muscular power, while those of active brain succumb to its influence more readily; and finally, he demonstrated by two experiments the mode of death. In a pigeon fully narcotized, a galvanic current called the muscular system into prompt activity, showing that the anæsthetic left the muscles unaffected, and that its action was upon the nervous centres. In a rabbit that had ceased to breathe, the lungs were found contracted and pale, while the heart was beating rhythmically; showing that the respiration was the vital function that failed; and also that the expiratory effort continued after inspiration had ceased. In subsequent lectures the subject was continued, the means of resuscitation pointed out, and the uses of other anæsthetic agents discussed. We gather, from some of Dr. Richardson's observations, that he believes a person apparently dead from chloroform—that is, a person who has ceased to breathe, and who would actually die if either neglected or improperly treated—may be restored to life in almost every case; and that thus his rather large proportion of 'necessary mortality' may be converted into a mortality that will be only temporary or apparent."—*Lancet*, 1870.

Deaths have occurred from time to time during the employment of chloroform, but in many of these instances cardiac disease was detected in post-mortem examination. In others, mere terror has been deemed the cause. Dr. Jeannell, in the *Gazette Hebdomadaire*, May 6, 1870, says that he deems the fatal issue principally due to the terror felt by the patient before the operation. He thinks the patient should not be made acquainted with the precise day when an operation is to be performed. All cause of anxiety, nervousness, and trepidation should be avoided.

Amylene.—This substance was discovered by M. Balard, Professor of Chemistry in Paris, nearly thirty years ago. Dr. John Snow of London was the first to employ it as an anæsthetic. Dr. Snow thought that it possessed advantages over chloroform, but experience has not confirmed that estimate. It is rarely, if ever, employed for anæsthetic purposes.

606. **Bichloride of Methylene, Methylic Ether, Nitrous Oxide Gas.**—Various other anæsthetics have been introduced from time to time, some of them of great power, but possessing disadvantages that hinder their employment, especially in obstetric practice. The bichloride of methylene was introduced by Dr. Richardson, who has done so much good and useful work in connection with this subject, but the doctor himself has not a high opinion of it for the purpose of anæsthesia. "It belonged to a dangerous family of chemical substances," and could not be widely employed without some risk. We are glad the learned doctor has expressed himself so unequivocally in regard to his own child, the more so seeing that at its birth he was inclined to extol its virtues perhaps a little too strongly.

Methylic Ether was also discovered by Dr. Richardson in 1867. Dr. R. inhaled it for the first time himself in May, 1867. He was thoroughly unconscious in seventy seconds, and recovered almost instantaneously, without nausea, headache, or any other unpleasant symptom. Since that time, this ether has been a good deal employed for minor operations, where alone, like nitrous oxide gas, it can be usefully employed. It is one of those anæsthetics of rapid but evanescent power, and, therefore, unsuitable for obstetric purposes.

The nitrous oxide gas, as is well known, is now extensively employed also as a rapid anæsthetic. It has proved to be a safe enough remedy for brief operations, but is inapplicable where we wish prolonged anæsthesia, owing to the certainty of asphyxia being induced.

These are the principal anæsthetics which have been proposed of late years. We think we may safely affirm that none of them for obstetric purposes, or prolonged operations, come near to rivalling the early anæsthetic of Simpson—chloroform. We must still cling to it, as to an old and valued friend, with a warmth inspired and quickened by many beneficent deeds in trying times.

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